Foundations of a Defense Digital Platform: Business Systems Governance in the Department of Defense

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Abstract

In 2010, the United States Department of Defense (DoD) spent more than $35 billion on information systems development and sustainment, with nearly $7 billion to defense business systems investments alone. It is not surprising given the scale of expenditure and complexity of the enterprise that its track record on business systems investments has not been great. Indeed, the DoD's investment management practices have been the target of many studies identifying critical concerns with how the taxpayers' dollars are spent. The get-well plan, according to these same studies, is to apply "industry best practices" to achieve the same results. Yet this view fails to adequately account for the underlying issues that give rise to these symptoms.

Mistrust and confusion in governance decision structures, strategic goal misalignment, externally driven metrics that incentivize the wrong behavior, and a culture of guarding rather than sharing information were among the dominant challenges identified through stakeholder interviews. Cross-cutting issues included language barriers between the Services and Corporate DoD that impede knowledge integration and complicate performance measurement. These systemic foundational problems are deeply rooted in the nature of this public administration network and in the cultures of its strongly independent member institutions.

Resolving these dysfunctional characteristics requires more than a transformation "playbook" of best practice initiatives. This research sets the trajectory for meaningful progress in defense business systems investment planning and management by outlining the fundamental changes that must occur, anchored by a more robust and transparent governance framework.

Thesis Supervisor: Jayakanth Srinivasan
Title: Research Scientist

Acknowledgements

In any work that represents the accumulated efforts of an extended period of time, there must necessarily be a long line of contributors whose individual inputs were instrumental in bringing that work into being. This is no exception. Over the past fourteen months I've had the great pleasure and good fortune to talk with many people who have each left an indelible mark on the ledger of my experiences here at MIT.

First, I must thank my thesis advisor, Dr. Jayakanth Srinivasan. "JK" has had a profound impact on my thinking about enterprises, and in particular has given me a new perspective on my old perspectives about this complicated Department of Defense. He encouraged me and made me dig deeper into what my experiences were telling me, how they were informing my intuitions and how those intuitions were reflected in what I found in the research interviews. He questioned what I thought were fairly straightforward ideas and helped me to pick other 'needles' out of my haystack that eventually grew into major themes. Most of all, though, I want to thank Dr. Srinivasan for the exemplary dedication he has shown to the men and women of the armed forces in his tireless research into post-traumatic stress and behavioral healthcare delivery, documenting the institutional and cultural challenges of providing for these military members and their families.

I would also like to give thanks to Prof. Deborah Nightingale and the faculty, staff, and associated members of the Lean Advancement Initiative, both past and present. You have provided an environment of enlightened curiosity and a tremendous body of research and experience in lean enterprises and enterprise transformation. In particular, I would like to thank Dr. Eric Rebentisch and Dr. Jorge Oliveira for some incredible discussions on topics that affected my research both directly and in wonderfully roundabout ways. Thanks too, to Ms. Juliet Perdichizzi, Ms. Nicolene Hengen, Dr. Bob Kenley, Mr. Dick Lewis, Ms. Stephanie Toews-Moeling, Mr. Mark Prendergast, and Ms. Sarah Benson for each and every day I had a chance to work with and learn from you. And to Lt Col Dan Marticello, who shared many of the same frustrations and a great many more laughs, thanks for keeping me sane.

My research was very substantially influenced by the work of Dr. Jeanne Ross, Dr. Peter Weill, and the research staff of MIT's Center for Information Systems Research. I found a great deal of value in the Sloan course "Business Strategy and the Role of IT" taught by Dr. Ross and the discussions with her in and out of class have helped shape my views about how inextricable information technology has become from business strategy.

The foundations of real value from this research came from my conversations with many people inside the Department of Defense and beyond, and to these anonymous people who shared hours out of their extremely busy schedules to talk candidly about their own experiences, I owe my sincere appreciation.

And finally, my enormous gratitude to Mr. Pat Hale, the faculty, staff, and students of the System Design and Management program. From the very first days in August of 2010 through the baptism by fire that is the SDM "Boot Camp" in the snowy days of January, through the Spring, Summer, and Fall terms of this year, I have met some of the most amazing minds and wonderful friends, and I am much the better for it.

Dedication

As I sat thinking of how best to dedicate this thesis, I asked myself, "How can you ever hope to convey to the world just how grateful you are to the people who matter most, who have sacrificed their time with you to allow you to pour yourself into this work? How can you let them know how much it meant to you to have such a loving and supportive wife, who reassured with a glance or listened to the small triumphs and big frustrations alike?...who brought warm dinners in and kept the storms of the day out of the study?...and who reminded you each day that working on this research was the most important thing you would do that day until it came time to step outside the door and play with your son? And how can you tell the reader how it made you smile inside and out to hear your 4-year old son tell you 'It's okay, Dad, you can go upstairs and do your work and we can play later', knowing that he would have just as big a smile on his face to play for ten minutes before bed as if you had played the whole day? Would the reader understand just how important your Mom...your Dad (wherever he is looking down from)...your sister...your Mom and Dad-in-Law...had each been in all the moments that had somehow led to MIT?"

But then, this dedication isn't for the general reader.

My sincere love and thanks to you, Mom, Dad, Tracey, Patty and Geoff...I hope you know how much you all mean to me and how helpful your support has been. And to my Sweets and Silly Buddy—what can I say but you are my world, always and forever?

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CHAPTER 1. THE PLATFORM IS BURNING

1.1 MOTIVATION

In 2010, the United States Department of Defense (DoD) spent more than $35 billion on information systems development and sustainment. By way of comparison, the DoD's information technology (IT) expenditure was greater than the total military budgets of 95 percent of the world's nations as reported by the Stockholm International Peace Research Institute (SIPRI Institute 2010). Of that $35 billion, nearly $7 billion went to defense business systems (DBS) investments (OASD (NII) / DoD CIO et al. 2010). With over 2.1 million active duty military and civilian personnel, it is the largest employer in the world's largest economy and manages over 30 million acres in real property (DoD 2011). The DoD consists of three military departments, 17 agencies, 10 field activities, eight staff organizations, and nine Combatant Commands (OUSD (Comptroller) / CFO 2011). In every sense, this is a very large, complex, enterprise.

True, the sheer size of its IT budget is daunting or impressive depending on your point of view, but the interesting part isn't how much the DoD spends. The key issue is how

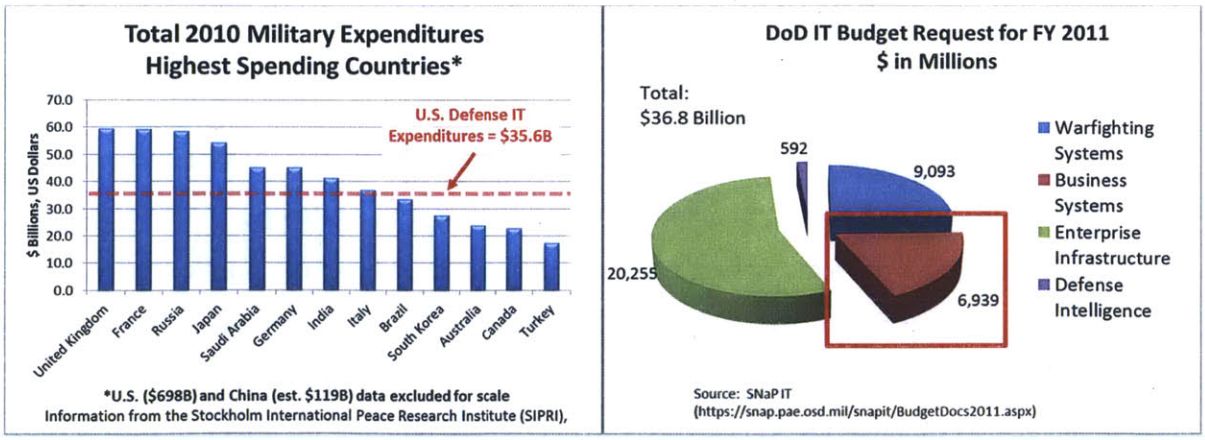

Figure 1 Left: U.S. Defense IT expenditures in comparison to the total military budgets of the world's highest spending countries. Right: FY 2011 President's Budget Request for IT. Sources: Adapted from Stockholm International Peace Research Institute's Yearbook 2010 and the Office of the Secretary of Defense Select & Native Programming Data Input System – Information Technology (SNaP IT), https://snap.pae.osd.mil/snapit/BudgetDocs2011.aspx.

it decides what to spend it on. With such a large and complex enterprise, it should come as no surprise that the DoD's investment management practices have been the target of many studies identifying critical concerns with how the taxpayers' dollars are spent.

Even a brief glance at the series of Government Accountability Office (GAO), Defense Science Board (DSB), and external independent reviews reveals several common "pain points" for the Department's investment management. Duplication of effort, long acquisition timelines in the face of rapidly changing technology, a cultural fascination with systems over business process needs, system investments that are neither adequately measured nor tied to business outcomes, and nonstandard, Service-unique implementations to meet needs common across the defense enterprise are the usual suspects. It doesn't usually take too much prompting to get those embroiled in the process to identify more issues, regardless of whether they're inside or outside the Department. The reason it's so easy to strike up the conversation is that these very same people are expressing frustrations about something they care so much about.

Senior leadership isn't blind to these realities, either. In his address to the American Enterprise Institute on May 24, 2011, Defense Secretary Robert Gates highlighted the Pentagon's portfolio challenges, characterizing the decision framework as "a semi-feudal system – an amalgam of fiefdoms without centralized mechanisms to allocate resources, track expenditures, and measure results relative to the department's overall priorities" (Gates 2011). So if everyone agrees things need to change, why haven't they?

This is actually a trick question. Defense acquisition and investment management policy is quite fluid, often changing in response to legislation which attempts to drive the DoD toward the adoption of industry best practices that are the subject of countless private sector case studies and public sector analyses in the management literature. As a figure of merit, a recent review of DoD acquisition policy issuances revealed nearly 60 new or updated policies in the last 24 months (OUSD (AT&L) 2011). These policies are intended to implement the intent of Congress by institutionalizing industry practices through a cascade of downward directed guidance that multiplies as it moves through OSD, the DoD agencies, and

the Services. The underlying assumption is that these industry practices are directly translatable to the defense business enterprise.

Is that assumption valid? Many of these practices have evolved in environments representative of monolithic enterprises, yet as mentioned previously the DoD is far from a strictly hierarchical monolithic organization. Indeed, the DoD might well be described as the "Departments of Defense", with separate and sometimes overlapping authorities vested in the Services and OSD. Certain decision mechanisms such as business systems investment reviews chaired by OSD leadership overlay onto this network, providing centralized authority schemes that mimic traditional hierarchical structures. However, the practical outcome is that many such decisions are heavily influenced or determined by activity that occurs outside the formal governance regimes, usually because the formal mechanisms are inadequate to support the decisions required.

1.2 BIRD'S EYE VIEW OF THE DEPARTMENT OF DEFENSE

1.2.1 Overview

As mentioned previously, the DoD is a very complex network of organizations. As shown in Figure 2, the Defense Department is a collection of separate organizations brought together under the National Security Act of 1947 and its 1949 Amendment (1947; 1949). The position of Secretary of Defense (SECDEF) was created to lead the new Department and that position was assigned a Deputy Secretary of Defense (DEPSECDEF) to assist in managing the organization. The Department of the Air Force was established under that same act and placed alongside the Departments of the Army and Navy under the Department of Defense. Other notable additions to the military establishment were the Joint Chiefs of Staff (JCS), an advisory organization consisting of the military Chiefs of the Services and led by an appointed military Chairman, and the Office of the Secretary of Defense (OSD) providing policy and staff support to the SECDEF and DEPSECDEF. Over the years, Defense Agencies and Field Activities have been established, merged, and eliminated, evolving into the 27 separate organizations in existence today and reporting up through OSD.

The Goldwater-Nichols DoD Reorganization Act of 1986 further amended the structure of the DoD by extracting warfighting command authorities from the respective Services and placing them with a new set of Combatant Commanders (COCOMs) who reported through the SECDEF to the President of the United States (1986). At the same time, Goldwater-Nichols strengthened the hand of OSD to manage the DoD's policies and investments, although the Services retained their statutory authorities to budget for and execute activities associated with their organize, train, and equip functions.

OSD has itself changed many times since its creation. As of 2010, the staff had grown from the three Special Assistants designated in the 1947 National Security Act to five Undersecretaries of Defense (USD), the Director Operational Test & Evaluation (DOT&E), Director Cost Assessment and Program Evaluation (DCAPE), Director Administration and Management (DA&M), the Deputy Chief Management Officer (DCMO), four Principle Deputy Undersecretaries (PDUSD), twenty-eight Deputy Undersecretaries (DUSD), ten Assistant Secretaries (ASD), and a number of subordinate Director and other designated positions. Changes to this distribution of positions were mandated in the FY 2010 National Defense Authorization Act (NDAA) and are being enacted through the DoD's transition plan (OSD 2010b).

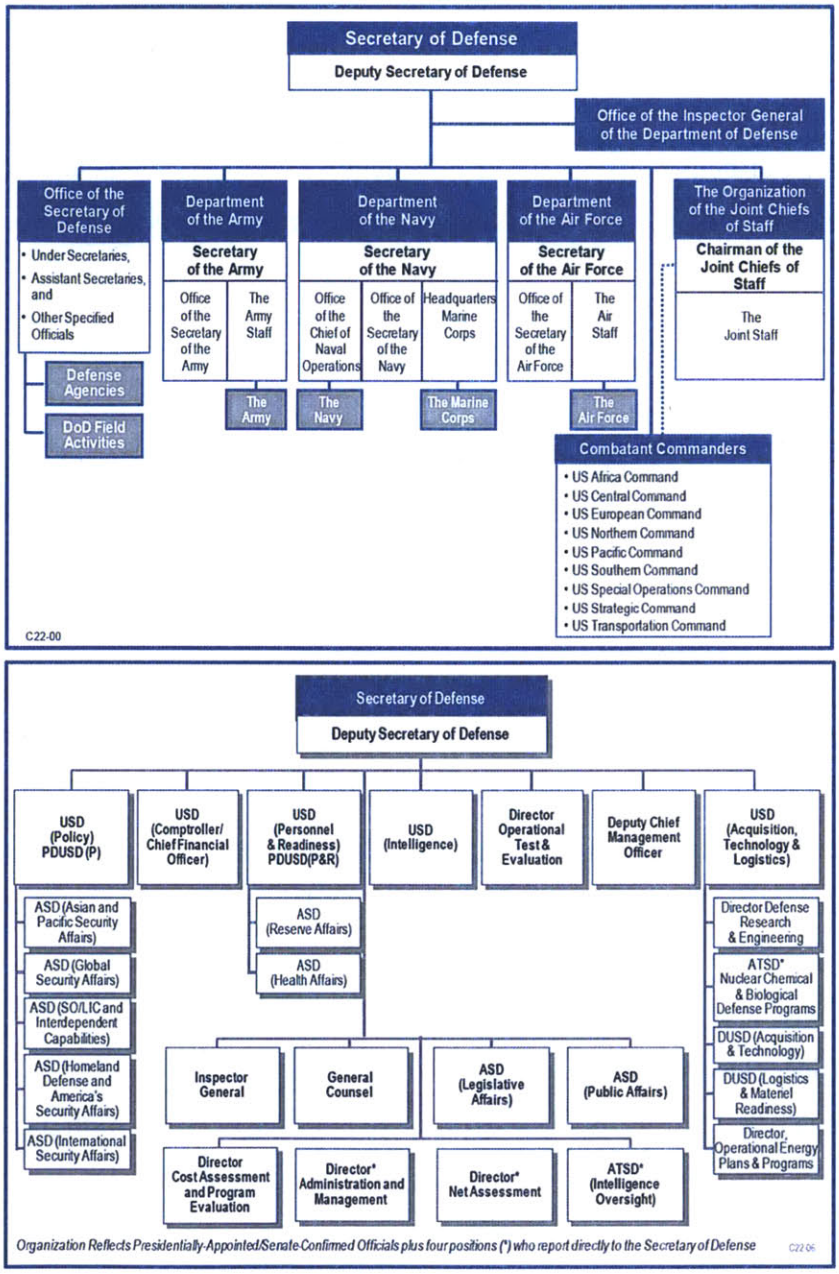

Figure 2 Organization of the Department of Defense (top) and the Office of Secretary of Defense (bottom) today. Source: OUSD (Comptroller) (2011).

1.2.2 Division of Responsibilities

Within the Department of Defense, many responsibilities are clearly divided between the various major elements of the enterprise although there are numerous areas where those responsibilities overlap.

1.2.2.1 Secretary of Defense

The chain of command for all matters related to defense runs through the SECDEF. The SECDEF is the principle advisor to the President for all such matters and is responsible to develop and execute defense policy in support of the President's National Security objectives.

1.2.2.2 Deputy Secretary of Defense

The DEPSECDEF directly supports the SECDEF and is authorized to act on his or her behalf with full authority to use any and all of the SECDEF's statutory powers as necessary.

1.2.2.3 Office of the Secretary of Defense

OSD is chartered to help plan, develop, and carry out National Security and Defense policy, tasking the military departments, the Chairman, Joint Chiefs of Staff, and the unified commands. The five principle domains are policy, finance, personnel and readiness, intelligence, and materiel support. Oversight for the DoD's investment management comes primarily through the Defense Comptroller (USD(C)), the Undersecretary of Defense for Acquisition, Technology, and Logistics (USD(AT&L)), and more recently, the Deputy Chief Management Officer (DCMO). This role is accomplished through a variety of mechanisms including the management of the budgeting process, issuance of acquisition policy, and authority for milestone review approvals on programs designated for their oversight[1].

1.2.2.4 Military Departments

The MILDEPS organize, train, and equip defense forces to perform a variety of missions in support of National Security and Defense objectives. Through their equip responsibilities, the Services plan, budget, and execute acquisition programs to deliver warfighting, combat support, and business system capabilities for Service-specific and joint users.

[1] For an overview of the Planning, Programming, Budgeting, and Execution and Defense Acquisition Systems, see 4.1.

1.2.2.5 Joint Staff

The Chairman, JCS (CJCS) is the principle military advisor to the President and oversees planning and coordination of military operations. Through the Service Chiefs the CJCS helps coordinate Service positions on issues affecting the military force. The Joint Staff also manages the system of requirements for defense materiel needs, validating acquisition requirements for major programs and activities of joint interest[2].

1.2.2.6 Unified Commands

Six geographic and three functional unified commands provide the means for the SECDEF to employ military forces worldwide. Combatant Commanders (CCDRs) lead the unified commands and establish their own prioritized materiel needs that are accounted for by the Services in establishing their long-term plans and budgets. These needs are represented and validated through Joint Staff or Service-specific requirements oversight mechanisms.

1.3 STRATEGIC DEFENSE CHALLENGES AND BUSINESS PRIORITIES

1.3.1 Strategic Environment

As described by former Secretary of Defense Robert Gates in 2010 (2010), the strategic environment in which Defense priorities are established continues to evolve as an outcome of world events, military and otherwise. The dominant challenge today is the reality of the ongoing war in Afghanistan and the broader fight against Al Qaeda and its allies. This includes support to a fledgling democracy in Iraq and regional security partnerships around the world. At the same time, the wave of democratic revolutions associated with the Arab Spring and continuing to threatened long-standing institutions throughout the Middle East create uncertainty about the conditions under which the U.S. military will operate in the future.

[2] For information on the Joint Capabilities Integration and Development System, see 4.1.3.

Elsewhere in the world, the growing power and influence of China and its neighboring rival India require greater integration of other instruments of national power and more nuanced application of military capabilities in partnership with a great many state actors, some familiar and others no so. Economic disparity fueling rising tensions in the equatorial belts and the increasing risk of global pandemics against the backdrop of climate change also create conditions that could lead to conflict given the right spark.

At the same time, the Department's strategy must contend with other forms of asymmetric warfare in nontraditional regimes. Space and cyber are tremendous assets to the U.S., but those strengths are also sources of critical vulnerabilities, too. Weapons of mass destruction remain in the collective conscious as state and non-state actors present continued threats to international security. And organized crime is increasingly important as the U.S. contends with its impacts within and beyond the borders and as a vector for terrorists and other that would see harm done to America. In light of this complex and changing environment, the Department of Defense reviewed its military priorities in 2010.

1.3.2 Defense Priorities

The strategic priorities for defense missions and resource allocation are formally reassessed in depth every four years as part of the Quadrennial Defense Review (QDR). As required by U.S. Code Title 10 Sec. 118 (a), the QDR Report is delivered to Congress on February 1 of the year it is due. The most recent QDR was performed in 2010, and it outlines the long term objectives for the Department of Defense. As described in the report, the emphasis for the Department following nine years of conflict in Iraq and Afghanistan and with anticipation of contracting budgets was to rebalance the force in order to achieve four key priorities:

- Prevail in today's wars
- Prevent and deter conflict
- Prepare to defeat adversaries and succeed in a wide range of contingencies
- Preserve and enhance the All-Volunteer Force

In support of these priorities, the QDR identified five thrusts to guide investment decisions. The first was to rebalance the force, shifting resources and capabilities to cope with the new environmental uncertainties. The second thrust centered on taking care of the DoD's workforce and their families for both military and civilian personnel. Third, continue to develop and maintain strategic partnerships throughout the world and establish regionally tailored defense postures. Finally, the DoD will reform the way it does business, including policies and processes for security assistance, export control, defense energy consumption, and improving defense investment management practices. This last strategic thrust is in a broad sense the primary motivator for this thesis, with particular focus on defense business system investments.

1.3.3 Fiscal Realities

The Budget Control Act (BCA) signed into law in August 2011 was created to enforce fiscal discipline by driving Congress to identify ways to reduce the growing deficit under penalty of automatic budget cuts if it failed. On November 21, 2011, the Joint Select

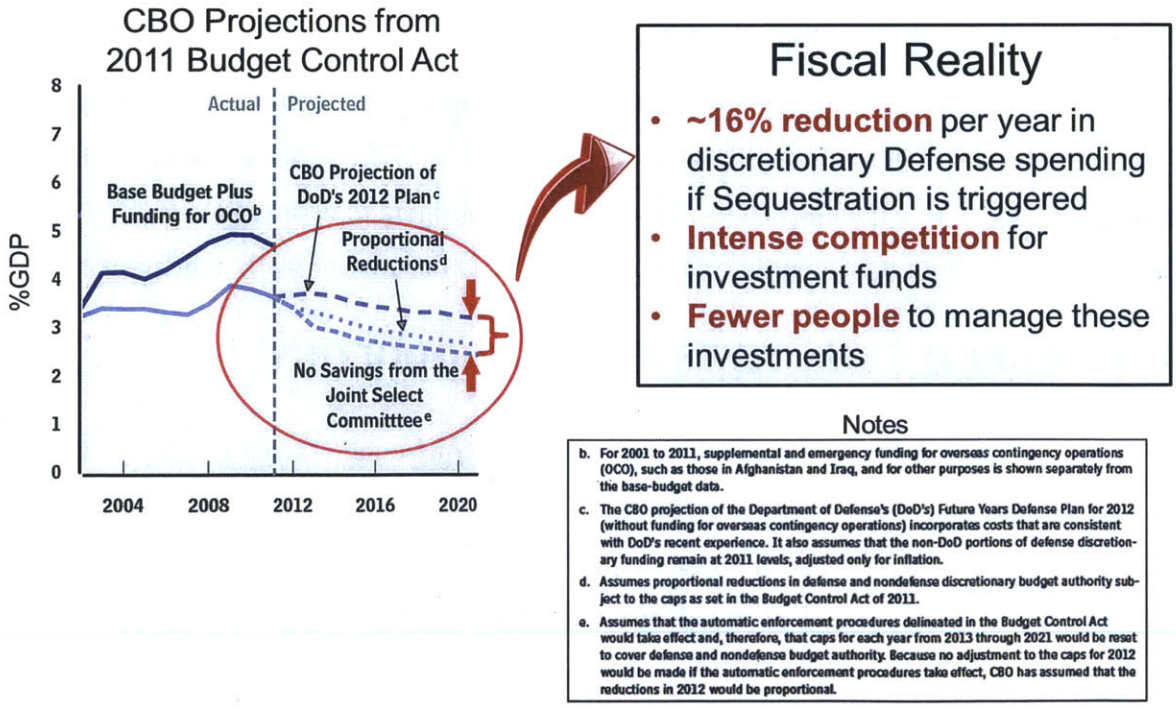

Figure 3 Congressional Budget Office top-line budget authority projections under several scenarios. Source: CBO (2011a).

Committee on Deficit Reduction, better known as the "Supercommittee", declared defeat in its challenge to find a bipartisan solution to the budget crisis. With that failure, Congress opened the door to deep defense cuts starting in early 2013 through the so-called sequestration triggers from the Budget Control Act of 2011, provided the cuts survive the coming election year. Figure 3 shows the budget projections from the Congressional Budget Office, with a roughly 16% reduction in defense budgets over the next 10 years relative to the President's plan for 2012 (2011a).

According to Todd Harrison of the Center for Strategic and Budgetary Assessments (CSBA), those automatic cuts would slash non-war defense by nearly $100 billion from the 2013 numbers in the President's 2012 budget request (2011). In order to achieve this large a cut in one year, the Department would necessarily target significant acquisition program reductions by delaying, reducing, or canceling weapons buys, and the law currently requires that all investments be cut proportionally.

Given the stark fiscal landscape projected for the next 10 years coupled with the recognized imperatives for improving the way the Department of Defense spends money to modernize and sustain its business operations, it is crucial that smart steps be taken in the near term to fundamentally improve these planning and management practices, not only within Corporate DoD but with the Services and Agencies as well. Fifteen years of critical reporting and legislative mandates have directed the Department to adopt industry's information technology investment "best practices", but is the answer really that simple?

1.4 RESEARCH OBJECTIVES AND METHODOLOGY

This research seeks to identify the underlying enterprise factors that impair the DoD's governance of its business systems investments. Are these factors similar to those faced in industry? How are the DoD's challenges unique? Which governance practices that correlate with effective investment practices in industry are relevant and translatable to the defense environment? What steps need to be taken to create sustainable change within the Department and what are the key obstacles to those efforts?

In order to answer these questions the research followed a sequential discovery and unfolding process incorporating methods from the Lean Advancement Initiative and the Center for Information Systems Research, both at the Massachusetts Institute of Technology. An extensive literature review informed the background and history of defense investment practices and provided the theoretical basis for subsequent analyses and recommendations. Building upon the body of research already accomplished and identified in the literature, exploratory interviews were conducted with several key contacts at the Office of the Secretary of Defense (OSD) in the National Capital Region and at the Electronic Systems Center at Hanscom Air Force Base, MA. These initial discussions led to a series of formal interviews with 12 senior level members at the Executive Schedule (ES), Senior Executive Service (SES) and General Officer (GO) level within the DoD as well as two Government Accountability Office members. Each interview was recorded and transcribed, then the draft transcription was provided to the interviewee to validate accuracy.

In parallel, the research incorporated the results of a 4-month enterprise transformation study in partnership with a commercial pharmaceutical company. This transformation case study was researched by the author with a small project team that included MIT students Sarvesh Saodekar (MIT System Design and Management 2011), Nirmalya Bannerjee (MIT System Design and Management 2011), and Edwardo Sackey (MIT Sloan MBA 2010) as part of an MIT Sloan course[3]. As part of the case study methodology, the team documented 20 interviews at various levels within the company's business technology enterprise, using the same technique for recording the interview, transcribing the notes, and validating with the interviewee. The results of the case study are presented in Chapter 8.

Once the interviews were documented, the source notes were coded to identify common vectors. Incidence of occurrence and recurrence across sources were tabulated to assess the strength and commonality of the vector. A second coding pass-through was then completed to group like vectors into major themes that became the root for a series of narratives identifying the nature and context of the issue, challenge, or success story. The

[3] Sloan course 15.571 "Business Strategy and the Role of IT, course instructor Dr. Jeanne Ross.

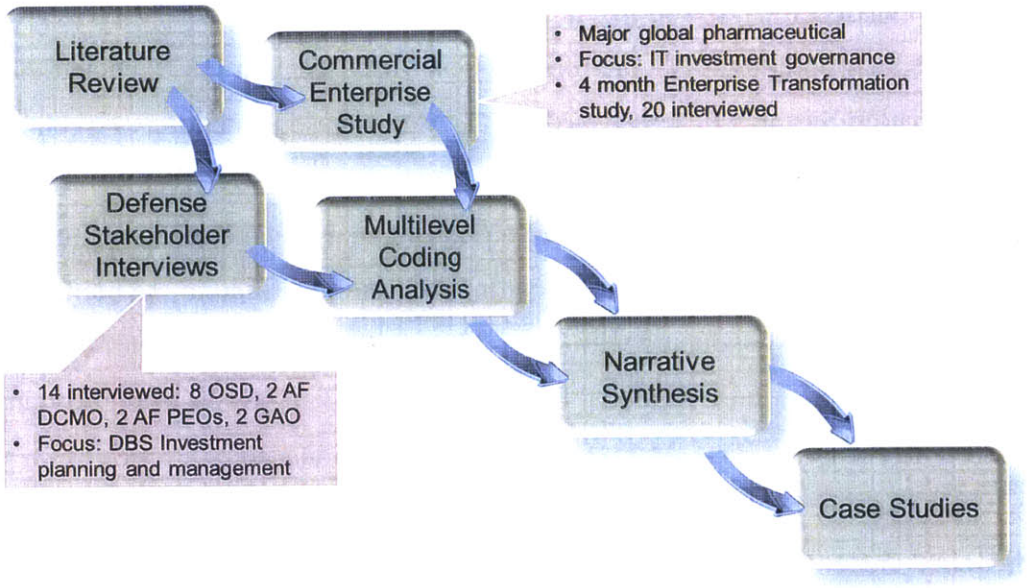

Figure 4 Research methodology.

integration of these narratives became the DoD and commercial pharmaceutical case studies that are documented and compared in Chapter 5 through Chapter 8.

1.5 NAVIGATING THE REMAINDER OF THIS THESIS

The remaining chapters in this thesis deal with various aspects of governance in the defense business enterprise, structured in a fashion that allows the interested reader to understand what governance is, how it has evolved within the Department of Defense, and how stakeholders of that enterprise view its investment planning and management practices. The reader can use the following guidelines as a pointer to areas of specific interest.

Chapter 2 begins by providing a brief introduction to governance frameworks using the framework and organizing principles developed by MIT's Center for Information Systems Research (CISR). Included in this framework is the taxonomy of governance elements that will be applied to the DoD context.

Chapter 3 reviews the history of business systems planning and management in the DoD from the 1990s up through today. Key reports, studies, initiatives, and legislative milestones are discussed to provide the background for how governance is applied today.

Chapter 4 follows the historical perspective with a detailed snapshot of the decision-making system in use for business systems today. The parallels and divergences between traditional weapon system acquisition and business systems are discussed and the reader is presented with the environment within which the stakeholders interviewed for this research live.

Chapter 5 through ***Chapter 7*** capture the analysis of the stakeholder interviews, bringing together perspectives from within and external to the DoD to shed light on the state of practice, its issues and challenges, and change initiatives currently underway.

Chapter 8 presents a parallel case study of a global pharmaceutical company struggling with similar challenges in its information technology investment governance. The key issues identified in primary research with stakeholders throughout their IT and business unit divisions are compared and contrasted with those noted in the DoD.

Chapter 9 synthesizes a future state reflective of a more effective defenses business enterprise and aligns to the future state characteristics a set of recommendations for substantive change. These recommendations are necessary elements for setting the conditions needed for sustainable change within the Department.

Chapter 10 completes the journey by encapsulating the key research motivations, findings, and recommendations and presents areas for further research.

CHAPTER 2. A CURSORY LOOK AT INFORMATION TECHNOLOGY GOVERNANCE

2.1 INTRODUCTION TO GOVERNANCE

Before moving further into a history of the DoD's business systems investment management practices, it is helpful to baseline the definition of what is meant by "governance". Rhodes highlighted the multiplicity of uses for the term, identifying at least six different definitions in common use (Rhodes 1996). For the purposes of this study, Stoker's explanation seems most appropriate: "the essence of governance is its focus on governing mechanisms which do not rest on recourse to the authority and sanctions of government." (Stoker 1998, p. 17)

When an enterprise is faced with making complex decisions that affect many key stakeholders, it creates governance mechanisms to bring those stakeholders together under a prescribed set of rules for how those stakeholders will work together, who gets to provide inputs to decisions, and who gets to make the ultimate decisions. In the realm of information technology, a commonly accepted definition from Weill and Ross identifies IT governance as "specifying the decision rights and accountability framework to encourage desirable behavior in using IT." (Weill and Ross 2004, p. 2) The key point in the definition is that governance is a *system* for decision-making, not the *act* of decision-making itself. That system includes elements of governing bodies, alignment mechanisms, and communication tools, requires clear definitions of roles and responsibilities, and must be driven by the overall strategic goals of the enterprise, not just its IT ambitions.

The following sections build upon the Weill-Ross governance framework (2004) in order to lay the foundation for describing the DoD's investment planning and management in terms that can be compared with commercial industry. The first step is to identify the crucial IT decisions that business leaders must consciously allocate.

2.2 THE FIVE CARDINAL DECISIONS THAT MUST BE ALLOCATED

The ability of an enterprise to align its IT investment priorities to its operating essence and business strategy hinges on a conscious allocation of IT decision rights in five key areas (Weill and Ross 2005). Leadership must first identify the guiding **IT principles** that acknowledge the operating model and describe how the business strategy is enabled by IT. They may also describe the role IT will play in enterprise transformation efforts to move the organization from a current state to a desired future state. Those principles then set the direction for decisions about the enterprise **IT architecture**. The architecture defines a set of rules for how the business's operational processes are supported by IT, providing a business context for technology and data standards that bound subsequent decisions about the **infrastructure** and **applications** needs of the enterprise. Finally, leaders must provide a system for evaluating and prioritizing **investment** decisions.

2.2.1 Principles

The operating essence of an organization is its fundamental organizing concept. Some firms, for example, operate on the idea that business units must maintain a high degree of specialized autonomy in order to achieve certain business objectives such as high growth. Others may emphasize standardization and centralized decision-making in order to realize the benefits of commonality when it exists across the firm's various business activities (Brown and Grant 2005). Because this operating essence has a much higher degree of organizational inertia associated with it than do business strategies—consider how hard it is to reorganize a company as compared with changing its strategic goals—this essence becomes an important anchor for deciding how IT will support.

An enterprise committed to strategic transformation must also assess how they want to operate at some point in the future and decide how they plan to get there. Transitioning from one model to another means building architecture flexibility to avoid making irreversible decisions that limit future options (Rhodes et al. 2009).

2.2.2 Architecture

The architecture provides a transition from strategic principles to a contextual environment for business process and technology decisions. It describes the essential organizational IT integration and standardization policies and business processes needed to execute the strategy through the operating model and aligns supporting IT systems and applications within that context. Weill and Ross provide virtually the same definitions for IT architecture (Weill and Ross 2004, p. 30) and enterprise architecture (Ross et al. 2006, p. 9), preferring "IT architecture" in the context of the five key decisions model and "enterprise architecture" to more broadly indicate the importance of business strategy and processes. Where such differences occur in this thesis the terms can be considered more or less equivalent unless specifically distinguished in context.

2.2.3 IT Infrastructure

The IT infrastructure decisions encompass services, technologies, and data management capabilities that support the enterprise IT needs, including hosting applications. Some definitions of IT infrastructure characterize it as "centrally coordinated" and "shared" (Weill and Ross 2005), although the choice to decentralize infrastructure capabilities to support specialized needs falls within this domain as well. Decisions in this area consider ways to build and evolve the infrastructure to be extensible and common, accommodate fixed site and mobility needs, and might include options to outsource provision of that infrastructure.

2.2.4 Business Applications

Decisions about business applications include strategies for building or buying software systems to meet specific business needs. Much of the organization's workforce experiences IT capabilities through these applications, and decisions about which applications to procure, support, and sunset can be among the most contentious in the investment planning process.

2.2.5 Investments

Although IT investments are the decisions most commonly thought of in the context of governance discussions, they should really be guided by the preceding decisions in a well-structured governance framework. Oftentimes IT investment disasters can be traced to making investment decisions ahead of laying a solid foundation based on principles, architecture, and strategies for infrastructure and applications. The rules for investment decision-making in the enterprise must address how investment options will be brought forward, evaluated and prioritized, and resources allocated. The enterprise IT funding and cost allocation models have a tremendous impact on these decisions, too. Funding models describe who has the authority to budget for and spend resources, while cost allocation models indicate how reimbursable expenses are distributed. When these models are misaligned with the allocation of decision rights, the resource owners are empowered (intentionally or otherwise) to second-guess the choices of the decision-makers. In dysfunctional cases, the "official" governance system becomes little more than a paper exercise with decisions made outside the formal channels.

When considering how to allocate those decisions, business leaders must determine who will make the decisions and who is allowed to input to them. At one extreme, all decisions are made in autocratic fashion without the benefit of consultation from anyone else. At the other end, consensus reigns supreme and decisions are subject to review and coordination from all corners. Additionally, the enterprise will determine at what level within the hierarchy these decisions will be made. Clearly, the choice of decision-makers and input-providers requires balancing concepts of unity of command and democracy, and that balance often varies across the five decisions.

2.3 GOVERNANCE MODEL

2.3.1 Governance Archetypes for Decision Rights Allocation

The Ross and Weill governance construct presents six model archetypes for decision-making based on research in the 1990s and early 2000s encompassing over 250 firms (2004, p. 3). These archetypes represent patterns of decision rights allocation across the enterprise, ranging from business monarchies, where decision-making occurs among the senior business

executives, to federal models, a hybrid approach with centralized corporate and distributed business unit participation, to anarchies where IT decisions are completely uncoordinated at the individual level. The process of creatively synthesizing this governance view for an organization forces leadership to intentionally plan how and where they want IT decisions to be made. Instead of letting these decision rights allocations "just happen", it drives a conscious choice to determine who gets to provide input and who gets to decide.

There is also an implied undercurrent to this framework that suggests that decisions are distributed not just across the senior management level, but vertically within the organization as well (Weill 2004, p. 228). Decisions will be delegated down to lower governance levels with exception processes identified for elevating issues that must be resolved at higher levels. Such tiered accountability approaches use thresholding criteria often associated with magnitude of impact to the enterprise. For example, decisions about IT principles might be retained at the executive level, but architecture decisions could be handled by a council chaired by the CIO, while infrastructure and business application standards might be pushed even lower. IT investment decisions above a certain high-dollar threshold would require approval at the executive level with lesser valued tiers managed at successively lower levels. This allows management to tie accountability to risk. A modified version of the framework presented by Weill and Ross might look something like Table 1.

2.3.2 Decision-Making Structures

The most visible artifacts of a governance system are the decision-making bodies that exercise the decision authorities. Often these take the form of boards, working groups, or committees with representation from units or partner organizations in the enterprise. These forums provide a structured means for addressing issues that require input, discussion, and where necessary, consensus from the participants in order to move forward.

Governance Archetypes	**Business Monarchy**	Business executives (such as CxOs) acting individually or in groups with or without the participation of the Chief Information Officer (CIO)										
	IT Monarchy	IT executives										
	IT Duopoly	IT executives working together with Business executives or Business Unit (BU) Leads										
	Federal	Business executives working together with BU leads or other business groups, and may or may not include IT executives										
	Feudal	BU leads or their delegates										
	Anarchy	Individuals										
		Input	Decide	Input	Decide	Input	Decide	Input	Decide	Input	Decide	Five Key Decisions
		Principles		Architecture		Infrastructure		Applications		Investments		
		Input	Decide	Input	Decide	Input	Decide	Input	Decide	Input	Decide	
Tier	**Level 1**	CxO, Board of Directors, Presidents, CIO[1]										
	Level 2	CIO[1], BU Leads[1], Functional Division Leads, IT Division Leads[1]										
	Level 3	BU Leads[1], BU IT Portfolio Managers, IT Division Leads[1]										
[1] Multi-tiered governance structures may use bridging across levels by key participants to provide vertical continuity												

Table 1 Modified version of the MIT CISR "governance on a page". Determine for each of the five key decisions who provides inputs and who makes the decisions. Addition of the lower half incorporating the Tiers by this author conveys the priority placed by leadership on the decisions based on how far down they delegate those decisions. Adapted from Weill and Ross (2004).

Two key elements of the decision-making structures are the roles and responsibilities assigned to the participants and their governing procedural rules. Roles and responsibilities determine who gets to provide input to decisions and who makes them, establishing order of precedence and priority for participation. The governance archetypes presented in Section 2.3.1 above reflect the roles and responsibilities for the five IT decisions. The procedural rules of the decision-making structures establish which issues are addressed, how and when they are addressed, and the criteria for making the decisions. These can be more or less formal, published or hidden, detailed or broad. The essential aspect is that they provide a

shared understanding of how the governing bodies should operate, subject to stakeholder interpretation of those rules.

2.3.3 Alignment Mechanisms

Alignment mechanisms are used to drive enterprise behavior in compliance with established decisions and strategic directions. Specifically, these tools and techniques serve to coordinate and synchronize the efforts of teams that would otherwise diverge. Alignment occurs vertically in the enterprise to ensure that implementation at various levels of the organization are in line with strategy and senior level decision-making, and in the reverse direction to ensure those decisions are informed by the realities that exist at the working level, with continuity of information up the chain. Examples of vertical alignment mechanisms include policy, performance measurement schemes, incentives, and multilevel governance tiers that use key personnel bridging between levels.

Horizontal alignment occurs across the enterprise to link activities and teams that are related in purpose or interdependent in some way. In many organizations this might include business process teams and portfolio management, business unit / IT relationship managers (Weill and Ross 2009, p. 105), and project planning and execution coordination processes.

2.3.4 Communication Methods

The communication methods that an enterprise uses in its governance system provide the connective practices for sharing and integrating knowledge. These include the channels, both formal and informal, through which policies, decisions, successes, challenges, and failures are distributed. They range from active approaches such as webcasts, town halls, email campaigns, training and education services, and various status meetings, to passive techniques leveraging web pages and enterprise databases. In some cases, an organization's incentive scheme can also communicate priorities.

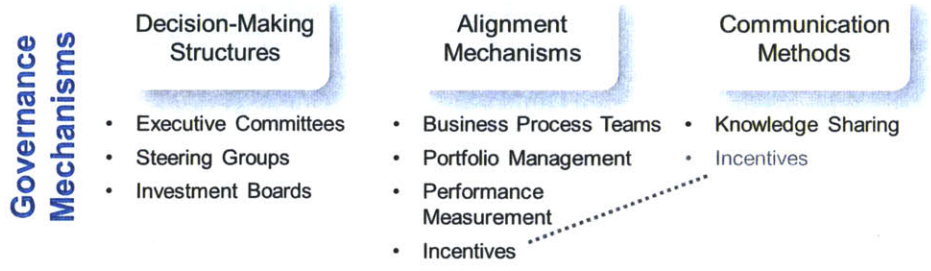

Figure 5 Three categories of governance mechanisms.

2.3.5 Funding Model

The means by which an enterprise resources its business system and IT initiatives plays a critical role in solidifying the decision rights and incentivizing certain behaviors. The funding model describes how these resources are allocated and who gets to decide how to spend them. Ideally, the funding model should support the conscious allocation of decision rights in the governance framework. When it does, the decisions made by those sanctioned to make them are backed up by the power of the purse, thereby reinforcing their authority. When the funding model is disconnected from the espoused decision rights, the decision-maker's power is undermined and informal governance structures emerge to help those with the resources make their investment decisions outside the official decision-making structures.

The funding model can also be a determinant for success in enterprise-wide initiatives. Organizations that establish strategic goals for increased operational efficiency through standardization, integration, and commonality, but distribute all the funding to diversified business units will struggle to consistently find sponsorship and resources among the individual business units for shared technologies and services, particularly when the profit and loss responsibility resides with the business leads and the payoff from enterprise initiatives is long-term. According to Weill and Ross, firms whose funding model is based on clear priorities for investments, transparent decision processes, and feedback mechanisms for measuring investment effectiveness get the most out of their IT dollars (Weill and Ross 2009, p. 50). Throughout the remainder of this thesis, the issue of distributed budget authority and inter-Service rivalry will appear as a key impediment to the enterprise efficiency objectives that have been outlined for improving Department of Defense investment practices.

2.4 AN IMPERATIVE FOR GOOD GOVERNANCE

Why is effective governance important for defense business systems investment planning and management? Research in the commercial sector estimates that firms with strong governance frameworks have 20% higher profitability as measured by return on assets (Weill and Ross 2009, p. 91) and are 40% more effective in generating returns on their IT investments than their peers (Weill and Broadbent 1998, p. 233). Granted, the Department of Defense isn't in the business of generating profits, but they and their stakeholders are keenly aware of the mounting pressure to demonstrate improving returns on their tax dollar expenditures.

In the area of public administration networks, governance provides a structured means for individuals and organizations that may have no formal relationships in chain of authority to set direction, make decisions, and manage implementation. In practice, strong stakeholder identification with their own organizations, responsibilities encoded in statute or regulation, and cultural differences are the norm and can be significant challenges to effective governance.

CHAPTER 3. REVIEW OF DEFENSE BUSINESS SYSTEMS INVESTMENT PLANNING AND MANAGEMENT

3.1 BACKGROUND

A 2010 Government Accountability Office (GAO) report identified that the DoD relies on over 2,000 different business systems to manage its human resources, finance, acquisition, and logistics functions (GAO 2010a). In many cases these functions are duplicated across the various Armed Services and defense agencies, collectively referred to as the DoD Components. In large part, this duplication occurs as a consequence of years of accumulated IT capability growth and tailoring to meet requirements that at one time may have seemed justifiably unique. However, given recent budgetary pressures resulting from the economic recession and the Fiscal Year (FY) 2010 defense budget mandate to bring ongoing contingency operations costs in Iraq and Afghanistan under the budget baseline rather than through supplemental funding, the DoD cannot afford to proliferate and sustain multiples of its core business systems.

Indeed, issues such as these have been raised across a wide range of independent third party assessments. Notable reports include those by the GAO, Congress itself, the Center for Strategic and International Studies (CSIS), the Defense Industry, and leading IT industry analyst Gartner. Even within the DoD, there is a long-standing recognition of the need for change. A joint Navy-Office of the Secretary of Defense (OSD) review conducted with the RAND Corporation in 2007 emphasized the sheer volume of defense policy surrounding the acquisition of IT systems in support of command, control, and communications (Gonzales et al. 2007). One of the more influential studies was the 2009 "Report of the Defense Science Board Task Force on Department of Defense Policies and Procedures for the Acquisition of Information Technology" (Defense Science Board 2009), which provided a number of key recommendations included in the FY 2010 National Defense Authorization Act as the basis for a requirement to develop a new IT acquisition methodology.

Legislative changes related to defense IT and business systems investment management have been numerous as well. The Paperwork Reduction Act of 1995, the Clinger-Cohen Act of 1996, the e-Government Act of 2002, and National Defense Authorization Acts for the fiscal years 2005, 2008, and 2010 included substantive direction for improving governance of defense IT spending. It's worth noting at this point that the GAO alone has published over 1,100 reports on Federal IT issues, roughly 300 of those involving the DoD (GAO 2011b). What is listed here is a set of key reports that bear most on the theme of this paper. The reader is referred to a much more exhaustive list accessible at the GAO's web site. The next section provides a brief chronological review of the key studies and legislative initiatives related to the DoD's DBS investment planning and governance.

3.2 REPORTS AND FINDINGS

As mentioned previously, there has been no shortage of change initiatives with the goal of improving the effectiveness and accountability of the DoD's investments. The recurring pattern associated with these initiatives over the last 15 years seems to be a series of critical reports from independent agents such as the GAO, Congressional Committees, or the Defense Science Board (DSB), followed by legislation, then interim defense policy changes, leading to reform initiatives that fail or are incompletely implemented, documented in GAO reports, and on and on.

3.2.1 The 1990s

Although prior legislation had begun the journey toward building a coherent framework for harnessing the opportunities afforded by IT to improve Government efficiency and effectiveness, the first significant steps toward a systematic approach to Federal IT investment management came through the Paperwork Reduction Act (PRA) of 1995 (1995). The PRA of 1995 required agencies to evaluate the role of information resources in meeting their business needs and tasked those agencies with incorporating best industry practices in their investment planning. Further, the PRA encouraged the use of common standards across the Federal government to maximize interoperability and the effectiveness of IT spending for the taxpayer.

The Clinger-Cohen Act (CCA) of 1996, formerly the Information Technology Management Reform Act of 1996 (1996), refined the requirements of the PRA by establishing more specific accountability in Federal IT management. The overall objective of the CCA was to focus attention on how the Federal government managed its IT investments. Specifically, it required each agency to establish a Chief Information Officer (CIO) and elevated overall leadership of Federal IT management to the Director, Office of Management and Budget (OMB). Additionally, it stipulated the need for adoption of commercial industry best practices and commercial off-the-shelf (COTS) technologies where possible.

One of the more interesting elements of the law was that it required the DoD CIO to consider the economic analysis of a major IT investment before approving its CCA certification, a prerequisite for meeting an acquisition milestone review. Through these and other provisions, the CCA guided Federal agencies toward thinking in terms of strategic goals and business processes first before buying systems. OMB published Transmittal 3 to its Circular
A-130 "Management of Federal Information Resources" in 1996 (OMB 1996) and Transmittal 4 in 2000 (OMB 2000) to further clarify the CCA requirements. However, both the law and the OMB Circular lacked clear implementation guidance and effectively left each agency to its own devices in establishing its enterprise architecture and management practices.

3.2.2 The Early 2000s

In 2000, the GAO created the Information Technology Investment Management (ITIM) framework for assessing organization maturity as a next step beyond the CCA. Analogous to the Capability Maturity Model Integration system developed by the Software Engineering Institute in coordination with the defense community, the ITIM provided an assessment methodology by which an enterprise could determine the extent to which its own investment management mechanisms reflected generally accepted industry best practices. Additionally, the ITIM was intended to drive enterprise improvement efforts through a five-stage maturity model, linking investment decisions and processes to effective outcomes. The ITIM was later published by the GAO in 2004 as report GAO-04-394G, "Information

Technology Investment Management: A Framework for Assessing and Improving Process Maturity" (GAO 2004a).

With the increasing importance of IT in Federal spending, Congress again directed the GAO to review the planning and management practices of 26 Federal agencies in 2004. The report identified inconsistent application of required and recommended practices. The GAO determined that less than half of these agencies had implemented the 30 key strategic planning and investment management practices either required by law already or recommended in guidance from OMB or the GAO. Their recommendations to the Department of Defense were similar to those for other agencies as well: incorporate information security resource requirements and implementation timeframes into their annual performance plan; institutionalize a framework of measurements to assess progress in meeting IT goals; and establish a set of IT performance metrics to track expected and realized business benefits derived from the use of IT. In addition, the GAO suggested the DoD document how its IT portfolio management related to "other departmental processes and the department's enterprise architecture" (GAO 2004b).

3.2.3 2005 and Beyond: A Turning Point

FY 2005 signaled a shift in the Congressional view of the DoD's ability to manage its business investments. Previous legislation had largely stopped at identifying the desired outcomes the Department should achieve. The NDAA language in 2005, however, directed the use of a specific governance model, down to the level of detail of specifying who would participate in the senior-most review boards and what supporting governance bodies they should establish. This reflected dissatisfaction with the degree of structure, rigor, and leadership involvement in the defense business systems investment management practices.

The FY 2005 NDAA included language that required the DoD to institute a new methodology for planning and executing its DBS investments. Section 332 of the FY 2005 NDAA (referenced to the US Code as Section 186 of Title 10) required the establishment of the Defense Business Systems Modernization Committee (DBSMC) as the senior-most decision making body on issues related to the continued development of the defense Business Enterprise Architecture. Further, the law also identified the need to designate Certification

Authorities and establish Investment Review Boards (IRBs) to reviews DBS investment proposals and provide recommendations to the DBSMC. The high-level guidance for the implementation of this management structure was also prescribed in the NDAA (incorporated into 10 USC Section 2222), which spelled out requirements for annual certification of new and ongoing DBS programs. Finally, the law directed the DoD to submit to Congress a report in March of every year documenting compliance with the requirements of the statute and describing the cost savings benefits realized for each successful modernization (2005).

In 2007, the GAO took aim at the DoD's approach to managing its enterprise portfolio. In their report, "Best Practices: An Integrated Portfolio Management Approach to Weapon System Investments Could Improve DoD's Acquisition Outcomes", the Congressional watchdog agency compared DoD's investment management approach to successful commercial industry practices. In the firms highlighted, investments were managed at the enterprise level using a framework that ensured a mix of current business sustainment, business enhancements, new business capabilities, and breakthrough opportunities in support of strategic goals. Investments are traded against one another and the overall effect of the investment "ecosystem" in achieving the organization's business imperatives guides decision-making rather than letting each business unit optimize its own performance in isolation.

In contrast, the GAO characterized the defense enterprise as rigidly divided along Service lines, with warfighter requirements, budgeting, and program execution occurring separately. The GAO acknowledged that statutory authorities specifically granted to the Service Secretaries for independently managing their enterprises is a contributing factor, but they go on to note that by the time investment proposals are brought to the level of corporate DoD decision-making, they've built up so much political momentum from the Service stovepipe processes as to make "no" decisions exceptionally rare. Additionally, the GAO noted that Defense Department tended to select preferred solutions earlier and with greater uncertainty than their commercial industry counterparts. As a result, requirements, program scope, and risks are less defined at the point where budgetary commitments are made. At the time of the report in 2007, its authors identified pilot programs within the DoD to establish

and manage according to joint capability portfolios as a first step toward portfolio management best practices (GAO 2007).

In March of the following year, Kathleen Hicks of the Center for Strategic and International Studies (CSIS) authored "Invigorating Defense Governance", the culmination of a six-year, four-phase *Beyond Goldwater-Nichols* study of various aspects of the defense enterprise and strategic decision-making. The report took a senior leadership perspective in exploring the state of defense governance, that system of decision authorities, governing bodies, and accountability established to manage the decision-making processes. According to Hicks, the principle decision-making obstacles for the DoD are complexity and disconnectedness, stakeholder underrepresentation, lack of accountability, absence of cross-talk and feedback among the various governance processes, and a slow, bureaucratic decision machine (Hicks 2008). Ms. Hicks is now the Deputy Undersecretary of Defense for Strategy, Plans, and Forces.

In parallel, the FY 2008 NDAA (2008) further refined business transformation guidance to the Department, designating the role of Chief Management Officer (CMO) for the Deputy Secretary of Defense and commensurate CMO roles for the Undersecretaries of the Services. The NDAA also created the office of the Deputy Chief Management Officer (DCMO) to assist in managing the Department's business transformation efforts. One of the key DCMO responsibilities was to serve as the vice-chair of the DBSMC in place of USD (AT&L), a move designed to increased dedicated oversight of business systems investment decisions. DCMO is required to publish a biannual Strategic Management Plan (SMP) describing high-level goals and performance measures for business transformation with key initiatives and oversight procedures.

With little substantive progress in improving the speed and success of defense IT capability delivery, Congress also inserted a requirement into the FY 2008 NDAA for the DoD to reexamine the suitability of the Defense Acquisition System (DAS) for information systems development. Specifically, the Act required the Secretary of Defense to direct the Defense Science Board to review and make recommendations for the improvement of the DAS. Furthermore, the DSB was to be tasked to look at roles and responsibilities across the

various acquisition governance bodies, the relevant existing defense acquisition policies embodied in DoD Directive 5000.1 "The Defense Acquisition System" and its derivative documents, metrics and reporting mechanisms, and the adequacy of weapon system test resources for information systems. The sense of urgency was high, and Congress gave the DoD 12 months to provide a report of findings. The response was captured in the March 2009 "Report of the Defense Science Board Task Force on Department of Defense Policies and Procedures for the Acquisition of Information Technology".

The DSB report was clear in its findings: the conventional hierarchy of processes for acquiring weapons systems is ill-suited to the demands of information systems that depend on rapidly changing technology and which require continuous upgrades for currency and security. This is especially true for systems that are built on COTS technologies, and the momentum of the past decade was pushing the DoD to institutionalize the use of COTS wherever possible. The DSB recommended the establishment of a new, separate acquisition system for IT. The centerpiece of this new approach would be an agile, incremental acquisition philosophy aimed at structuring programs with more up front program definition and requirements analysis in the first two years followed by capability releases on 18-month timelines. Historically, so-called "big bang" IT acquisitions were taking 91 months from initial identification of requirements to initial operational capability. Additionally, the DSB makes passing mention of the need for centralized enterprise IT governance to provide "conceptual integrity", but the discussion occupies only one paragraph and has no accompanying recommendations (Defense Science Board 2009).

Curiously, the DSB report makes no mention of the DoD's Business Capability Lifecycle (BCL), an acquisition process developed in 2007 for defense business systems based on the DBSMC and IRB governance model directed by the FY 2005 NDAA. The BCL had several features in common with the DSB-proposed IT acquisition process, including a more robust business case analysis and small, short increments of capability. A key feature of the BCL that was lacking in the DSB report was the requirement for business process reengineering in combination with planning for a materiel solution. This latter point was noted in the lone dissent by John Stenbit, DSB member and former Assistant Secretary

of Defense for Command, Control, Communications and Intelligence (Defense Science Board 2009).

Congress commissioned its own study of defense acquisition beginning in March of 2009. On the heels of the DSB report, the House Armed Services Committee Panel on Defense Acquisition Reform (DAR) began a year-long review of the DAS based on the sense that the acquisition framework was increasingly out of touch with the kinds of investments being made. The DAR Panel noted, for example, that services and IT acquisitions were the majority of acquisition spending, yet the provisions of the DAS were often inappropriate to the needs of those systems. Although the Panel's recommendations for improving IT acquisition were general in nature and tended to reflect observations made since the mid-1990s, their emphasis on looking to commercial industry was clear. Notable among these were development of IT-focused performance metrics to augment or replace the traditional financial execution and acquisition process metrics in use for major weapon systems, and greater emphasis on commercial market analysis for mature solutions before considering technology development (Andrews et al. 2010).

At the same time the HASC DAR Panel was developing their findings, Congress was putting into place additional direction to the DoD to revamp its IT investment management practices. The FY 2010 NDAA established a requirement for the Department to develop a new approach to building and buying information systems. Section 804, titled "Implementation of New Acquisition Process for Information Technology Systems", drew heavily on the 2009 DSB study, including explicit language to develop a process "based on the recommendations in chapter 6 of [the report]" (2010). Section 804 also required the DoD to submit its plan for instituting the new process by late 2010. The plan was to include a description of the process, any justification for departing from the DSB recommendations, a timeline for implementation, applicability criteria for various types of IT systems, and recommendations back to Congress for supporting legislation.

The FY 2010 NDAA also strengthened the requirements for business process reengineering, emphasizing a best practice that had been championed in policy and statute alike since the mid-1990s. Section 1072 of the law required the appropriate Component

CMO to attest to the fact that the business processes supported by each business system modernization had been reviewed and streamlined wherever possible and that any tailoring of commercial systems integrated into the solution had been minimized to avoid costly customization and protracted specialized support contracts.

The DoD was working on its Section 804 Report to Congress when the GAO published GAO-11-53, "DoD Business Transformation: Improved Management Oversight of Business System Modernization Efforts Needed" (GAO 2010a). In it, the GAO pointed to the classic vicious cycle of IT acquisition: modernization efforts experience cost overruns and schedule delays that force the Department to invest in maintaining costly legacy systems longer, thereby reducing funds available for the modernizations. Specifically, the GAO looked at the DoD's Enterprise Resource Planning (ERP) programs, and they found that none of the four major ERP programs reviewed had a comprehensive integrated master schedule, and three of the four lacked uncertainty and sensitivity analyses within the cost estimates. Perhaps more importantly, the GAO assessed that the DoD was not measuring the impact of these ERP systems in terms of improving business operations. As a result, there is no traceability from dollars spent to benefit achieved. In a letter of response to the GAO, the Deputy Chief Management Office agreed with the recommendations to implement scheduling and cost estimating best practices and for the Department and Services to establish business systems performance measures.

In December 2010, the Deputy Secretary of Defense signed out the DoD's Section 804 Report, "A New Approach for Delivering Information Technology Capabilities in the Department of Defense". As directed in the FY 2010 NDAA, the document included a high-level discussion of the DoD's plans for implementing a new acquisition framework for IT systems consistent with the recommendations of the 2009 DSB report. The new framework would emphasize a shift from large monolithic information system programs to portfolios of related smaller projects delivering relatively frequent increments of capability on much shorter schedules. Further, it would enforce an enterprise perspective in requirements development to ensure that requirements sponsors look toward common, open standards, and modular approaches rather than customized solutions to meet their needs.

From a governance perspective, the Section 804 Report also identified goals for reducing redundancy in oversight and establishing a tiered accountability system that places authority and responsibility at a level appropriate to the magnitude of the investment. These decision-makers would adopt a portfolio management approach in which project decisions and trade-offs are considered in the context of a system of related efforts within a capability roadmap rather than on an individual project basis. At the same time, the DoD identified improvements in its governance of business systems, pointing to the growing use of business process reengineering and the establishment of the Business Capability Lifecycle acquisition system.

The GAO gave the DoD some credit for its efforts in its June 2011 report "Further Actions Needed to Institutionalize Key Business System Modernization Management Controls", but highlighted the need for better progress with the Components in developing and populating their respective enterprise architectures. Several common issues were called out: lack of standardization, duplication of functionality among different systems, multiple separate instances of the same data on multiple systems, and lack of automated information exchange (GAO 2011a).

As the preceding history shows, the DoD's evolving IT and business systems investment planning and management practices have matured over the past decade and a half, often in reaction to critical review or Congressional direction. The FY 2005 NDAA marked a new chapter in defense business systems governance with the congressionally-directed establishment of the DBSMC, the use for investment review boards, and the requirement to certify business systems modernization programs as a prerequisite for spending the money appropriated to them. A chronological summary of the studies, legislation, and reform initiatives is contained in Figure 6. Figure 7 through Figure 9 presents a more detailed view of the principle themes recurring in reviews of DoD investment planning and management, recent reform initiatives, and legislative activity.

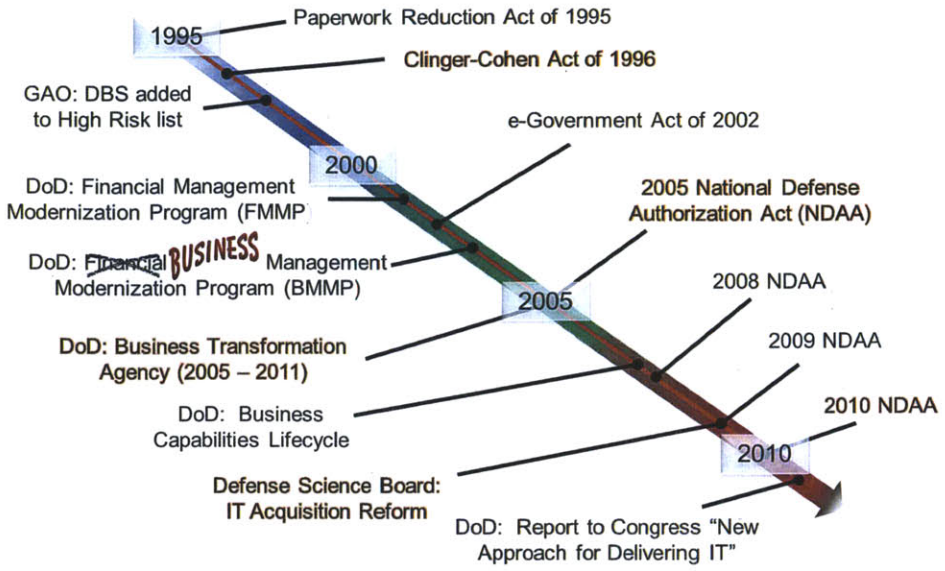

Figure 6 Chronological view of key studies, initiatives, and legislation. The most important items are shown in orange highlight.

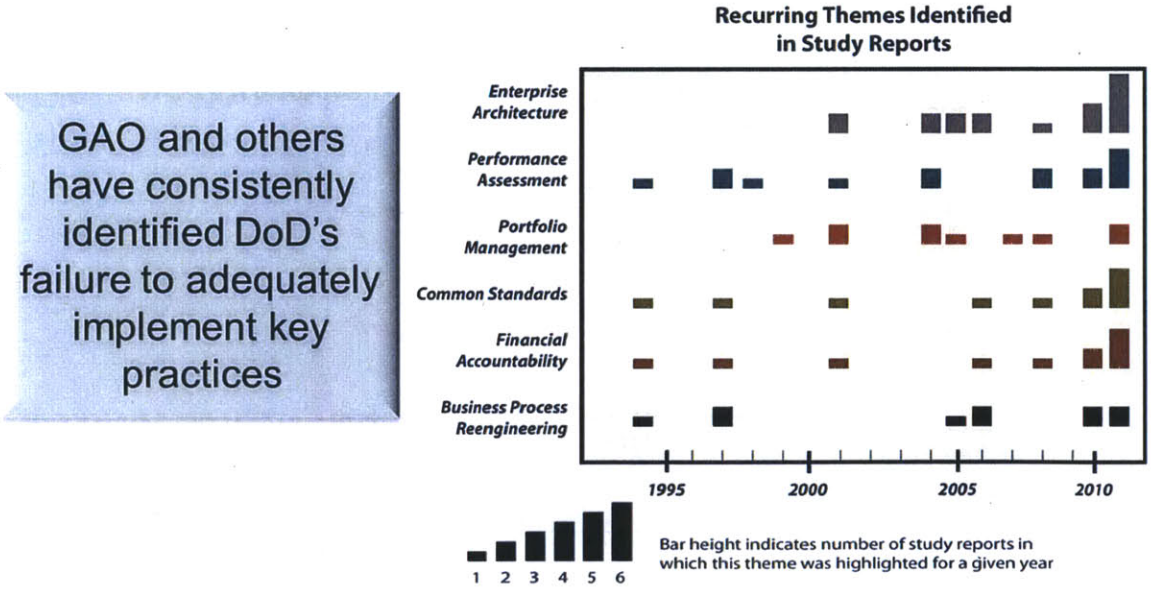

Figure 7 Key shortfalls in defenses business systems governance.

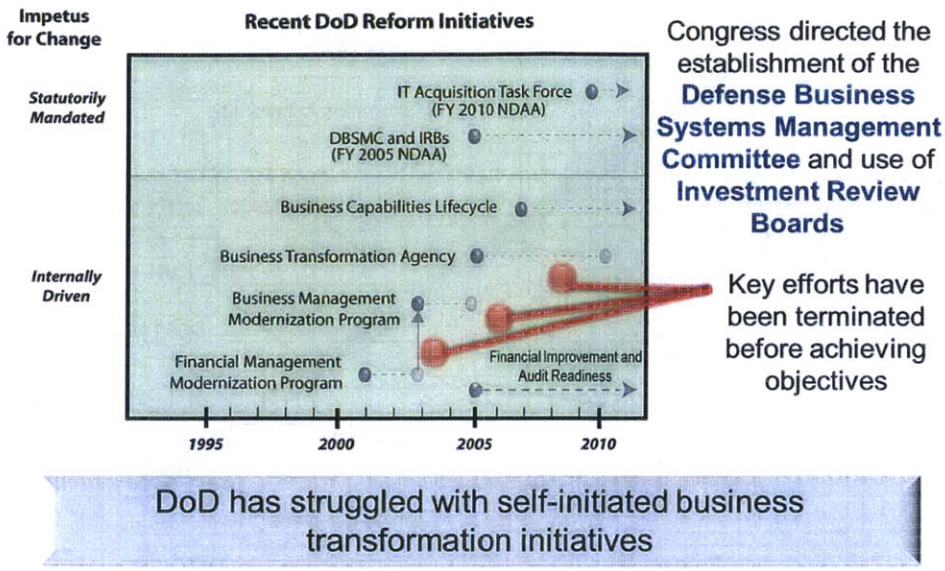

Figure 8 DoD investment management reform initiatives.

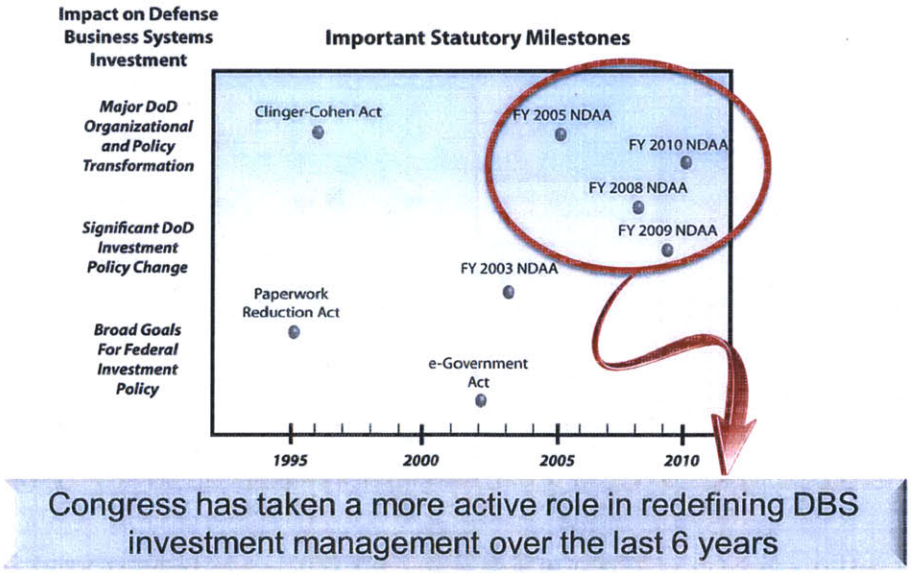

Figure 9 Legislative activity related to defense business systems.

The preceding history and discussion reveals a recurring pattern of stagnation in which characteristic problems as observed from the outside by the GAO and others are reported to Congressional stakeholders, who eventually reach a level of frustration that leads to legislation intending to correct these symptomatic problems. OSD reacts to the legislation

by issuing compliance policy which then flows down to the Services and Agencies. These institutions in turn issue their own implementing policy, and the combined weight of this "guidance" sits upon the PEOs and Program Managers who must build or adapt acquisition strategy and execution to accommodate. When policies are unclear or create too sever a burden, the Services and programs resist, attempting to restore equilibrium with familiar practices. Change fails to manifest in the form envisioned by Congress, GAO notes the lack of progress, and the cycle continues as illustrated in Figure 10.

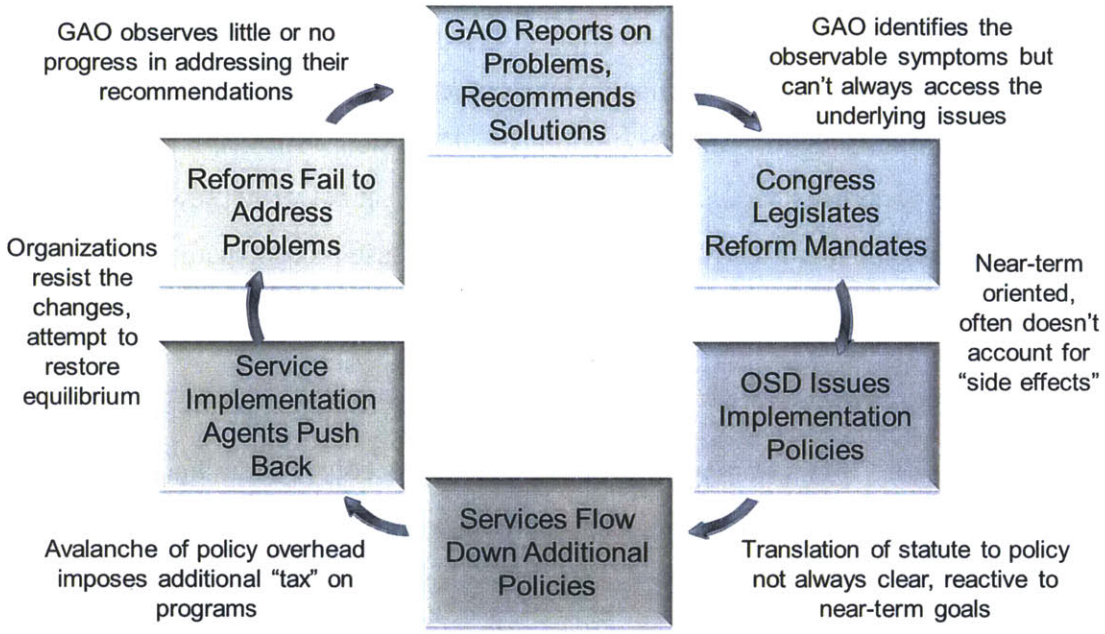

Figure 10 The cycle of stagnation in defense investment practices.

CHAPTER 4. DEFENSE BUSINESS SYSTEMS GOVERNANCE TODAY

4.1 THE TRIAD

In traditional defense systems, no discussion of governance would be complete without recognizing the classic triad of governance systems: the Defense Acquisition System (DAS), the Joint Capabilities Integration and Development System (JCIDS), and the Planning Programming Budgeting and Execution (PPBE) System. Although an in-depth discussion of these systems is beyond the scope of this paper, it is worth a few words to briefly introduce the role that each plays in defining our defense force structure as a backdrop to discussions of DBS investment planning and management today.

4.1.1 Defense Acquisition System

The DAS is the DoD's framework of policies and procedures for managing the Department's investments for developing and maintaining military capabilities. Although the DAS can be considered generally to encompass any and all defense procurement oversight, it is typically used in the context of the rules prescribed in the DoD Directive 5000.01 establishing broad, top-level themes, and its more detailed counterpart, DoD Instruction 5000.02. As embodied in these governing documents, the DAS provides a structured, standardized, and to some extent, tailorable set of guidelines for how programs should be planned and executed.

The DAS uses a set of acquisition milestones set at key points along the active investment portion of the system lifecycle with statutory and regulatory entry and exit criteria. Programs reaching the milestone review will typically undergo a tiered review process en route to the Milestone Decision Authority (MDA), including organizational and Component readiness reviews and an Overarching Integrated Product Team (OIPT) consisting of key senior level stakeholders that advise the MDA. OSD has recently added a series of senior level small-group reviews with the Principle Deputy to USD (AT&L) in

order to work out issues prior to the actual review with the MDA. At the milestone review, programs are expected to demonstrate compliance with the appropriate entrance and exit criteria and to present a coherent plan for executing the program, with a particular focus on addressing risk. Key elements of the review process include certification of full funding and consensus from the requirements sponsor that the system adequately meets the user's need, providing a measure of intersection with the budgeting and requirements processes, respectively.

4.1.2 Planning, Programming, Budgeting, and Execution System

The PPBE framework is the Department's system for planning resource requirements and monitoring execution realities in order to maintain as accurate as possible a view of defense spending needs. The PPBE feeds into the annual President's Budget submission process but is itself a two-year cycle to produce those inputs. Fiscal guidance for a given budget year is provided by the Office of Management and Budget (OMB) two years earlier and funding requirements are updated by the Components during Program Objective Memorandum (POM) development. Following an iterative series of POM and budget reviews at all levels within the Components and with OSD, the Components finalize their budgets for submission.

In planning for business system acquisitions, the Components must operate within the two year lead time cycle, projecting forward their budgetary requirements while being mindful of potential changes in requirements, budget realities, and technology change. When these systems are reviewed at acquisition milestones, they are required to demonstrate that they are fully funded, meaning all the funding needed in each year of the program is already encoded within the current Service or Agency budget. The requirements sponsor, preferably acting in coordination with the system development office, builds the compelling business case during the POM process to ensure the program meets this full funding criterion. This tight linkage between the acquisition governance and the fixed budgetary cycles is important for self-consistency, but it contributes strongly to long development cycles and rigid procurement processes.

4.1.3 Joint Capabilities Integration and Development System

The JCIDS system is the DoD's mechanism for reviewing and validating user requirements that drive capability development and integration. In its ideal form, the JCIDS process drives the user's requirements sponsor to view the need through the lenses of Doctrine, Operations, Training, Materiel, Logistics, Personnel, and Facilities (DOTMLPF) to consider to what extent the need could be met by some combination of each of these approaches rather than just by creating a new tool. For example, a particular need could be met by retraining operators to use existing systems in new ways rather than buying a new system. In reality, many requirements are established as extensions or new versions of existing systems and begin their life as materiel needs with the other six factors (DOT-LPF) brought in afterwards in such a way as to support the conclusion that a materiel solution is needed. For Joint interest programs, the Joint Requirements Oversight Council (JROC) is the senior-most governing body for validation of joint requirements.

As mentioned previously, an acquisition for a new system or a modernization to an existing system cannot begin without a validated requirement. The requirement sponsor must work closely with the program office not only in the JCIDS but as well in both the DAS and PPBE frameworks in order to ensure all elements of the program are choreographed to meet Component, regulatory, and statutory requirements. For defense business systems, the standard JCIDS processes and documentation are set aside in favor of the Business Capability Lifecycle (BCL) business case review, although the JROC can designate business systems as Joint interest and require JROC review of the business case documentation (McChrystal 2011).

Although each has evolved in its own right, the DAS, PPBE, and the JCIDS have long been the systems that the defense community has had to work through, and sometimes around, in order to acquire and field capabilities that enable this nation to maintain its defense posture. External critics and internal practitioners alike have recognized the need to streamline these for all weapon systems and in particular for information systems. Recent initiatives in defense business systems governance and IT acquisition reform are attempting to do just that while continuing to improve our ability to effectively manage the resources at

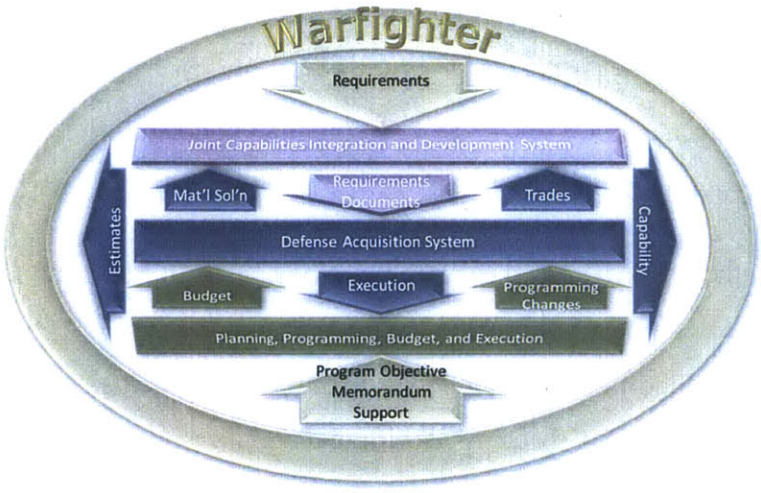

Figure 11 The Defense Requirements - Acquisition - Budget ecosystem.

our disposal. In the next section, we take a look at the investment planning and management framework for defense business capabilities today.

4.2 DEFENSE BUSINESS SYSTEMS GOVERNANCE MODEL

As mentioned previously, the current high-level structure of the DoD's business systems governance model was driven largely by the FY 2005 NDAA Section 332 which provided the language incorporated in 10 USC Sections 186 and 2222. These established the Defense Business Systems Management Committee (DBSMC), its membership, and the board's responsibilities. The law also required the DoD to identify Certification Authorities and charter supporting Investment Review Boards (IRBs), and it encoded the criteria by which investments could be approved.

4.2.1 Defense Business Systems Management Committee

The DBSMC as originally established by the law was to be chaired by the Deputy Secretary of Defense (DEPSECDEF) and included membership by the Undersecretaries of Defense for Acquisition, Technology, and Logistics (USD (AT&L)) and Personnel and Readiness (USD (P&R)), the Defense Comptroller (USD (C)), the Assistant Secretary of Defense for Networks and Information Integration / DoD Chief Information Officer (ASD NII / DoD CIO), the Service Secretaries, and others as appointed by the Secretary of

Defense. The statute allowed the DEPSECDEF to appoint a vice-chair, and from 2005 until 2008 this responsibility fell to USD (AT&L) (Wolfowitz 2005). The FY 2008 later designated the newly created DCMO as the vice-chair and updated Service membership to the Undersecretaries acting in their CMO capacities rather than the Secretaries themselves.

As directed by law, the DBSMC has three key functions. First, it recommends defense business systems policies and procedures to the Secretary of Defense. Second, it must review and approve any addition or change over $1 million to the Business Enterprise Architecture. Third, the DBSMC is charged with managing cross-domain integration. Congress also added new purse string powers to the DBSMC, requiring that DoD Component owners of new modernization programs over $1million gain certification approval from the DBSMC before they would be allowed to spend program dollars. Those same systems would thereafter be reviewed annually for recertification for permission to continue spending money. Penalties for obligating resources without this certification are severe, classified as violations of Federal law under the Anti-Deficiency Act.

The FY 2005 NDAA also clearly delineated responsibility for management of four core business areas across five portfolios as shown in Table 2. The certification authorities vested with these responsibilities are the Principle Staff Assistant's to the Secretary and

Business System Mission Area	Certification Authority
Acquisition, Logistics, Installations and Environments	USD (AT&L)
Financial Management	USD (C)
Human Resource Management	USD (P&R)
Information Technology Infrastructure and Information Assurance	ASD (NII) / DoD CIO
Any Systems Not Otherwise Covered	DCMO*

* DCMO replaced "the Deputy Secretary of Defense or an Under Secretary of Defense, as designated by the Secretary of Defense" as originally stipulated in the FY 2005 NDAA.

Table 2 Approval Authorities for Defense Business Systems in core mission areas as established in FY 2005 NDAA.

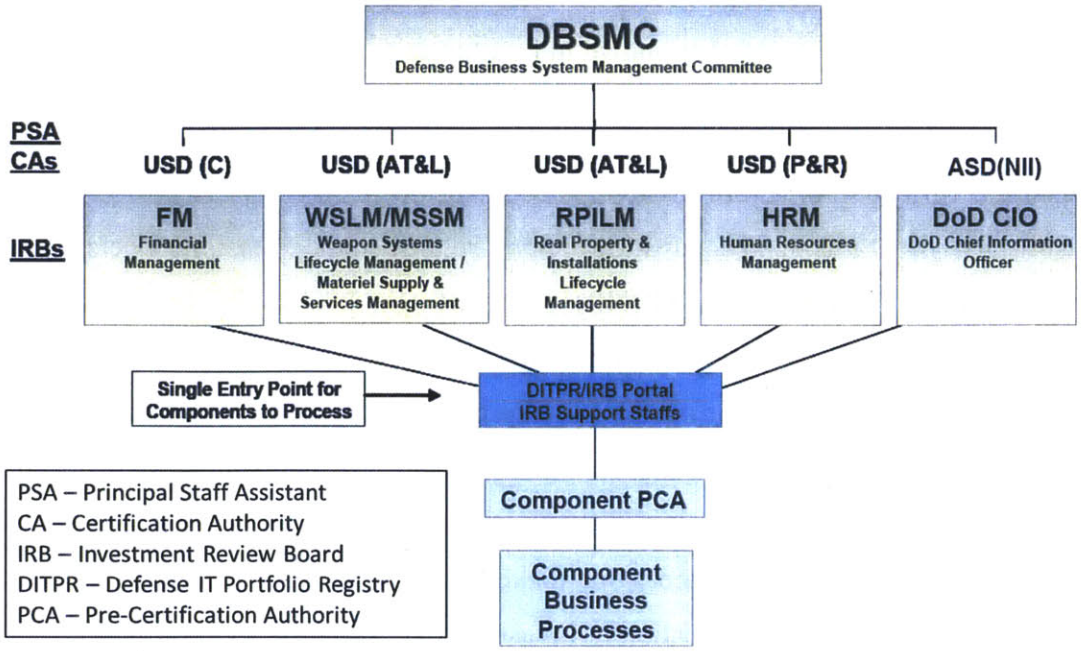

Figure 12 DBS governance structure. Adapted from "DoD IT Defense Business System Investment Review Process Guidance" (BTA 2009, p. 7).

Deputy Secretary of Defense for their respective areas, and each is required to certify to the DBSMC that the modernization programs they bring forward for review meet one of three key criteria:

- The system complies with the DoD's business enterprise architecture
- The system is required to meet a critical national security need
- The system is required to avoid significant adverse impact to another critical national security capability

4.2.2 Investment Review Boards

The approval authorities, also referred to as Certification Authorities (CA), were directed to charter Investment Review Boards (IRB) that would manage day-to-day portfolio coordination, develop and maintain business area sub-architectures, and review the modernization programs in the portfolio. By 2009, the structure had evolved to five core mission areas with Acquisition, Logistics, Installations, and Environments breaking out into Weapon System Lifecycle Management and Material Supply & Services Management in one

derivative portfolio and Real Property and Installations Lifecycle Management into its own portfolio. The IRBs were renamed as shown in Figure 12.

The function of the IRB is three-fold. As mentioned previously, IRBs review programs for certification or recertification in accordance with 10 USC 2222. However, they also review DBS programs in an acquisition support role when the Milestone Decision Authority (MDA) is USD(AT&L), ASD(NII), or DCMO (England 2009). In this capacity, they provide advice to the MDA with respect to the readiness of the program to pass the milestone. In practice, IRBs perform a third function, managing the development of business mission area enterprise architectures and recommending process and data standards needed to support integration across the systems in those architectures. It is this broad, end-to-end perspective within the core mission areas that makes the IRB the first line of defense to identify and mitigate potential duplication of investment. Given the sheer number of programs requiring DBSMC review and approval and the limited time available to do so, it is quite likely that the IRB is also the only place that this horizontal integration occurs.

Figure 12 also shows the linkage from the Component system owners into the IRBs for programs over $1 million. The FY 2008 NDAA had established the roles of the Component Chief Management Officers (CMO), requiring that they establish oversight that includes pre-certification of the business systems prior to review at an IRB. Although each Component has a different institutional review process, all culminate in the submission of programs into the Defense Information Technology Portfolio Repository (DITPR). Although specific IRB procedures differ among the mission areas, the Component's certification package for each system will include an attestation from the Pre-Certification Authority (PCA) as to the readiness of the system for review as well as documentation supporting regulatory compliance, economic analysis, and business process reengineering results (OUSD (P&R) Information Management 2011a).

4.2.3 Business Capabilities Lifecycle

In response to the recognized challenges of acquiring business systems under traditional Defense Acquisition System and Joint Capabilities Integration and Development System processes, Undersecretary of Defense for Acquisition, Technology, and Logistics

(USD(AT&L)) Kenneth Krieg directed the Department in February 2007 to outline a streamlined requirements and acquisition process better suited for these IT-intensive systems (Gansler and Lucyshyn 2009). The resulting Business Capabilities Lifecycle (BCL) was proposed to the DBSMC in April of that year, and on May 18, Undersecretary Krieg issued a memo requiring that the BCL concept be refined for implementation later that year (Krieg 2007a). On November 15, 2010, USD(AT&L) Ashton Carter directed all defense business systems to be acquired in accordance with the BCL under interim guidance (Carter 2010) which was formally reissued as Directive Type Memorandum (DTM) 11-009, "Acquisition Policy for Defense Business Systems (DBS)" (Carter 2011).

The BCL was designed to consolidate the functions of the JCIDS requirements mechanisms and DAS acquisition processes, incorporating both into a model that emphasizes incremental development. Under this model, business systems would be structured as multi-increment programs with business case and materiel solution analysis for the entire series occurring up front and individual prototyping, engineering development, limited fielding, full fielding, and operations and support phases for each increment as shown in Figure 13. Governance for the BCL occurs through the IRBs described earlier and the designated Milestone Decision Authority for the acquisition. The IRBs provide acquisition review and recommendations to the MDA much like the Overarching Integrated Product Teams mentioned in Section 4.1.1.

Although the BCL was established in 2007, it has seen limited use for actual business systems acquisitions. This will change as more systems coming through the acquisition pipeline come up to their Milestone Decisions. Indeed, given the objectives of the BCL and their similarity to those identified as necessary characteristics for the Department's new IT Acquisition Framework (OSD 2010a), the BCL may serve as the model for future information systems acquisition as well. Comparison of the BCL to the model proposed by the Defense Science Board in 2009 (2009) suggests their common heritage.

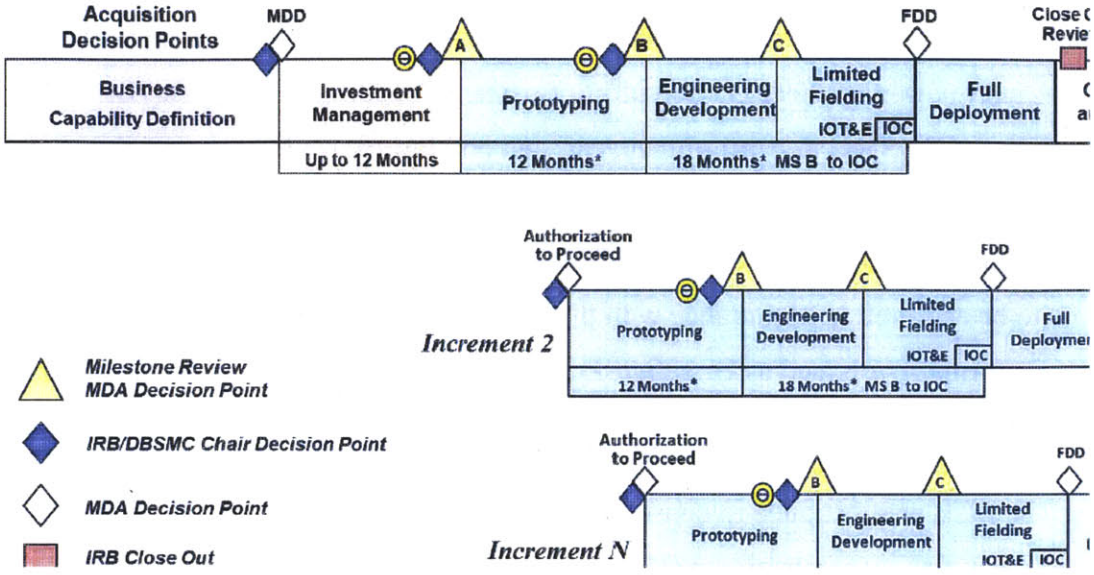

Figure 13 Business Capabilities Lifecycle acquisition model. Source: DTM-11-009, "Acquisition Policy

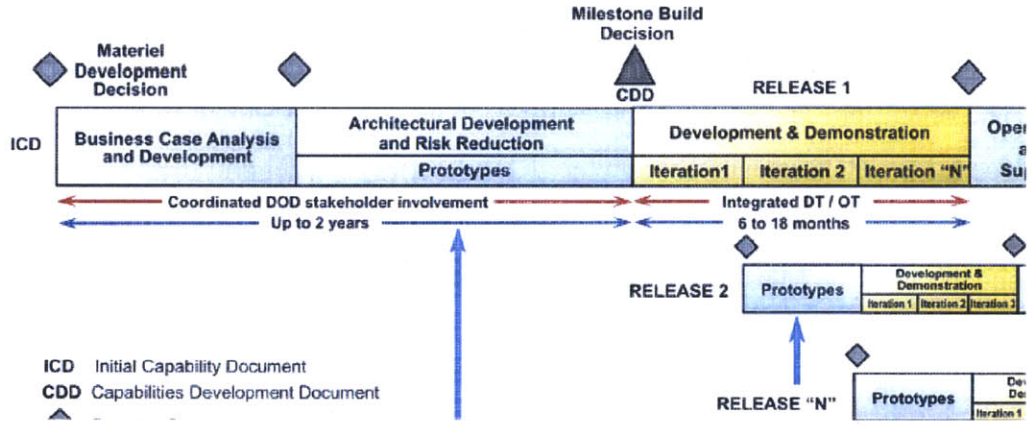

Figure 14 IT acquisition model proposed by the Defense Science Board in 2009. Source: Report of the DSB Task Force on Department of Defense Policies and Procedures for the Acquisition of Information Technology (2009).

In the next chapter, stakeholder perspectives on this governance framework, its strengths, and weaknesses are explored in depth. This provides a way to compare what is described here in Chapter 3 reflecting formal policy with the real-world experience of those involved in its implementation who struggle to translate top level guidance into day-to-day execution for investment planning and management. As is true in other environments, policy

represents the aspirations of how to implement an intent that many share with different interpretations. The results as experienced are often considerably different.

CHAPTER 5. CURRENT STATE IN PRACTICE: DECISION-MAKING STRUCTURES

5.1 CHALLENGES IN DECISION-MAKING

The most important governance structure in defense business systems investment management is the IRB. Although the DBSMC makes the decisions to approve certifications, the work to assess their business case and alignment to the business enterprise architecture occurs in the IRB. Additionally, the IRB serves two purposes: review programs for both certification and acquisition oversight. Although tightly coupled, these two functions address different statutory obligations. The first supports a recommendation up to the Certification Authority and eventually the DBSMC that a system meets one of the criteria specified in Section 2222 of Title 10 of the US Code. This certification simply means that a determination has been made that the system is compliant with the architecture and that it meets a critical need. It is a prerequisite for authorization to spend money on the modernization and must be obtained at the start of the program and every year thereafter unless multi-year certifications are granted (in which case the IRB must still review that program annually). Note that decertification is not the removal of the authorization to spend money, but a reduction in the amount authorized—decertified programs are still authorized to proceed. Neither the Certification Authorities nor the DBSMC itself has the explicit authority to cancel programs, although they can withhold the certification approvals required to spend money on them.

The second function supports the Milestone Decision Authority in making acquisition decisions at key points in the program lifecycle. Programs can be approved to proceed to the next phase with or without conditions, delayed with a rescheduled milestone, restructured, or cancelled. The annual report to Congress on Defense Business Operations includes tabulation of Certifications, Recertifications, Decertifications, as well as Milestone decisions including approvals, delays, and milestone deletions. Milestone deletions are not explicitly defined in the report and may indicate a milestone is no longer appropriate for a restructured

or rescoped program, that the program was placed on hold, or that it was cancelled. There is no way to determine through this report how many systems were disapproved or rationalized.

In order to perform these functions effectively, the IRB must review each eligible program with considerable diligence, a task which is complicated by a several key reasons highlighted in the stakeholder interviews. From the view of IRB members, many programs come through the process having already garnered substantial political support from their Services or Agencies who are also represented on the IRB. The decision apparatus must contend with influence from external and internal sources, and the IRBs must spend time peeling away the veneer that some interviewees referred to a spin and marketing. Because of the significant numbers of modernization programs that must be reviewed, the IRBs often have insufficient time for this critical analysis.

One of the coping mechanisms used by decision-makers to get around these problems is to work issues directly with the program stakeholders in separate meetings apart from the formal governance structures of the IRBs. These workarounds provide expedient pathways to make forward progress, but they create variability and reduce transparency in the decision process and serve to undermine the accountability of the IRBs. In addition, it was universally recognized that OSD has historically lacked the political will to disapprove or cancel programs. This serves to compound the workload as problem programs require greater oversight and recurring reviews while new systems are being added to the portfolios all the time. From the view of the programs, the governance structure and processes are not clear. Multiple accountability chains supporting the certification and acquisition requirements drive a proliferation of reviews and pre-reviews, and the rules of the road for implementing the defense business systems acquisition framework are still maturing.

5.2 POLITICAL MOMENTUM AND SUPPORT FOR SYSTEMS

When programs come before the IRBs, they have already undergone extensive review and coordination within Service channels. This begins with the preparation of an extensive set of documents that are summarized in the Business Case required of all defense business systems. These documents are co-developed with the Functional Sponsor and coordinated up through two separate paths. Within the Service acquisition channels, the documentation is

reviewed to ensure everything is in order for a Service acquisition review board. This acquisition board is effectively the Service Milestone Review (and in fact serves as the highest level milestone review for smaller programs) and approval results in the issuance of the Component Acquisition Executive (CAE) Compliance Memo required for the Milestone A and B reviews. In parallel, the Service CMO will review documentation related to the certification process in order to validate that the system is compliant with the Business Enterprise Architecture before approving release of the package to the IRBs.

The long process of precoordination is primarily designed to ensure programs are ready to meet the OSD reviews, but it also has the effect of building up political support for the program along the way. The degree of attention and support given will correspond to the magnitude of the program and its impact to the Service, and coalitions will form, activating informal networks in OSD and with key stakeholders to influence the governance process. One interviewee described the phenomenon in the following way:

> *"By the time it gets up to OSD it's already been filtered, a couple times, and whatever the major programmatic issues are, a lot of capital has already been expended in that networking we do so well"*

Additionally, several interviewees voiced the concern that IRB participants who are also proponents for other programs in that board's purview are hesitant to raise challenges during system reviews:

> *"One of the weaknesses of the IRB is that participants' decisions are impacted by their desire for their sponsored investments to be successful, so they may be less inclined to say no to someone else's program."*

It is possible that explicit or implicit expectations exist for these IRB members to do their best to ensure their institution's systems succeed, and in at least one case, the IRB chair is outranked by Service participants, which may impair his or her ability to ensure an objective process.

5.3 INSUFFICIENT TIME SPENT REVIEWING EACH PROGRAM

Programs prepare for the IRB by building an IRB documentation package coordinated within Service or Agency channels beforehand as described earlier. Ideally, the IRB would review the packages and validate the content before and during the IRBs. However, the time available for each decreases as the number of programs under review increases. Although the workload varies by IRB, one interview indicated that each board meeting lasts around two to two and a half hours over which they review three or four programs, and they have as many as three or four meetings in a given week. With only 30 to 45 minutes per program, the reviews go into less depth and begin to reflect a box-checking exercise to ensure all the entrance and exit criteria are satisfied rather than to objectively assess the value of the investment and its compliance with the architecture. Many of the OSD interviews revealed that programs with problems often come in with a polished message representing the Service position about how they've got it under control. A functional representative to one of the IRBs stated

> *"I find in the IRB there's insufficient time to get into what's underneath that, so it comes across as a lot of spin."*

Several other IRB members expressed some frustration that this "spin" serves in their view as an impediment to constructive dialog about resolving issues and getting to the core of how the proposed system fits within the architecture. As the time available to consider each investment decreases, the opportunities to ask hard, probing questions decreases and the IRBs are left to take the system owners' word for the content in the packages.

5.4 THE RISE OF AD HOC GOVERNANCE

Perhaps because of the recognition that there is insufficient time to review each program adequately, decisions are sometimes made in separate meetings outside the formal governance structure. These discussions include a different and likely smaller set of stakeholders, allowing the decision-maker to engage in a focused, streamlined assessment and negotiation. Although more expedient, these "one-off" meetings lead to pro forma IRBs at which issues identified have already been addressed or are otherwise taken off the table.

> *"Those IRB members that weren't part of the other forums will ask questions and the response back is that 'we've already covered that' or 'we've got that handled'...it's not like an IIPT[4]...you don't get to ask the hard questions...not everyone should be in agreement with the program, but you should understand what the differences are."*

As a result, IRB members are deprived of the chance to highlight issues that might otherwise bring a valuable stakeholder perspective to light, and they may question the productivity of the time spent in IRB meetings.

5.5 OSD DOESN'T SAY "NO" TO PROGRAMS

Despite the popular view from the programs that OSD exists primarily as an obstacle to progress, those on the IRBs and in the participating organizations want the Services to be successful. Although it's difficult to define "success" in this context, it appears to be a shared view that there is a stigma associated with cancelled programs that one IRB member characterized as "politically embarrassing". A cancelled program represents an admission that the investment committed already has gone to waste, and the desire to try to salvage something for the warfighter often leads decision-makers to rationalize continuation of troubled programs based on "sunk cost arguments". Said one senior leader,

> *"Despite knowing better, we still often fall back on sunk cost arguments to justify continuing to spend resources on poor investments."*

In the eyes of another interviewee,

> *"OSD hasn't demonstrated enough courage to tell a program no, because you want the program to be successful and you trust that the Services know what they're doing. So we give them a little more room, and they come back, and we give them a little more room..."*

These factors combine to make system disapprovals exceedingly rare as the DBSMC receives recommendations to certify or recertify the vast majority of systems reviewed.

[4] Integrating Integrated Product Team (IIPT) is an acquisition milestone preparation review for programs, bringing together working level stakeholder representatives from the Program Office, the user, OSD, the test community, and other key offices. The programs present their milestone review material and address critical feedback that must be addressed prior to the Overarching Integrated Product Team (OIPT) review with senior level advisors to the Milestone Decision Authority.

Interestingly, the annual DBO Report doesn't identify whether any programs were rejected as not having met the certification requirements. In FY 2010, the DoD reported that it conducted 173 certification reviews and another 100 non-certification annual reviews across the five IRBs (DCMO 2011a, p. 35-36). In addition, acquisition reviews were conducted for programs meeting major milestones, although it wasn't clear from the report how many additional discrete reviews were required. Because programs must be reviewed each year and new programs are being established continuously, systems will continue to accumulate, further reducing the time available to review each given the fixed human resources for governance. Using a stock and flow analogy, the inflow continues at a steady pace while the drain lets out only a trickle. Eventually the stock will overflow, and the situation on the horizon looks even worse.

Congress is currently considering draft language in the FY 2012 National Defense Authorization bill under review in the Senate (2011b) that will remove the term "modernization" as a qualifier to the types of programs subject to the defense business systems certification process. Under existing statute, business system modernizations over $1,000,000 must be certified and reviewed annually. If the Congressional language survives, and there is every indication from the interviews that it will, then the IRBs will need to add to their docket all the current systems in the field with total lifecycle expenditures over $1,000,000. A cursory look at the FY 2011 Presidents IT Budget Request available from OSD (OASD (NII) / DoD CIO et al. 2010) indicates there are conservatively 695 documented systems in current operation not designated as modernizations that meet the threshold for review[5]. This is likely a lower bound due to the probability that many systems in sustainment haven't been documented on the IT budget request. Although one might expect a lesser degree of scrutiny for systems in sustainment relative to modernizations, this still represents a minimum 400% increase in the number of certification reviews required.

[5] The data are available as a spreadsheet from https://snap.pae.osd.mil. The data were filtered to remove duplicate entries for the same system, then filtered to extract only Business Mission Area investments over $1,000,000 across a four-year period including the prior year, current year, budget request year, and the year after. This list was then filtered for Current Services funded with Defense Health Program, Operations and Maintenance, or Working Capital Fund appropriations to remove entries for Military Personnel funding, Military Construction, and the like.

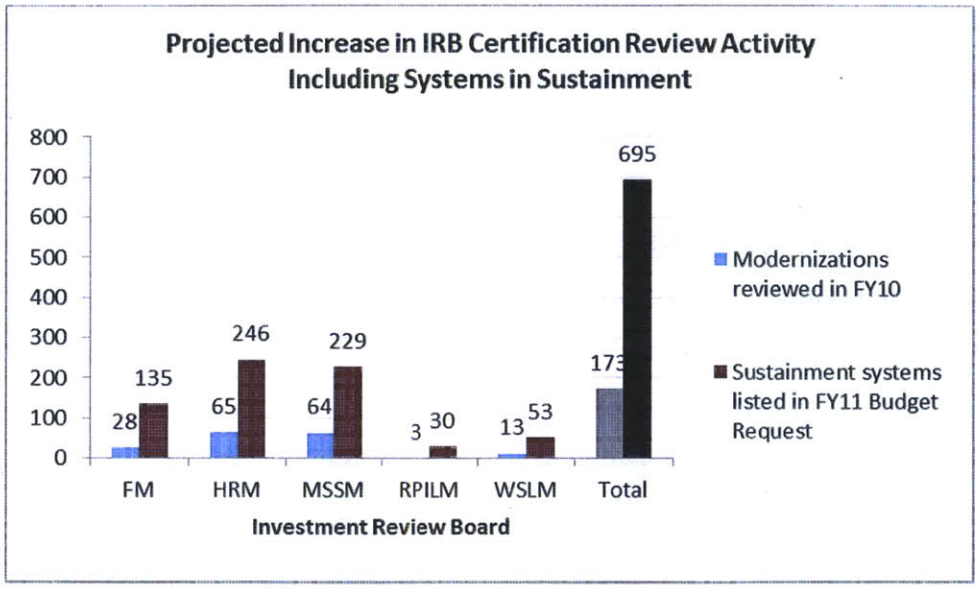

Figure 15 Comparison of IRB certification review activity for defense business modernizations with projected increases if systems in sustainment are added.

Another potential factor that may impact the ability of OSD to manage its business systems is an initiative under consideration by DCMO to expand the role of the existing Central IRB (CIRB) to integrate reviews from all the IRBs into one board. The concept is to consolidate the review process to improve horizontal integration and reduce the effects of the functional categorization that currently defines the IRB structure. It is not clear whether the existing IRBs would be retained as precursor steps or removed altogether. If the CIRB becomes a central clearing point for certification and acquisition reviews, they will need to find a way to manage the flow of nearly 1,000 certification reviews and the associated additional acquisition events.

5.6 WHAT IS THE GOVERNANCE?

From the point of view of the Program Executive Officers and Program Managers, there is a fair degree of confusion about what the defense business system governance really is. The high-level policies may be clear, but the message doesn't appear to have crystallized at the program level. Under the traditional DoDI 5000.02, there is a clear prescription of the actions each program needs to complete and the documentation required to meet the next milestone, and over the years an extensive support system has evolved both within the

Services and OSD to help programs understand what they need to do to pass the next milestone. The framework is cumbersome but thorough.

Directive Type Memorandum (DTM) 11-09 "Acquisition Policy for Defense Business Systems" also describes the milestone structure and required documentation within the Business Capabilities Lifecycle (BCL). However, the BCL is still a relatively immature system, having been exercised for only a dozen or so programs since its inception in 2007 according to one source at OSD. As a result, the support structure hasn't developed yet. Theoretically the BCL, like the DoDI 5000.02, is tailorable in terms of reporting requirements, although it can be difficult to find the OSD stakeholder willing to give up the document they are primary office for. Yet programs must risk the extensive time and effort preparing for and navigating the wickets leading to a milestone only to be told they haven't yet met the burden of proof to show they are ready to pass the next milestone. An Air Force PEO struggled with how to apply his Major Defense Acquisition Program[6] experience to form strategies and make decisions for an IT portfolio, then came to the conclusion that much of that experience "just doesn't apply". Although the BCL holds the promise of streamlining acquisition procedures by integrating elements of the JCIDS, the DAS, and the IRB/DBSMC governance systems, the framework is not well defined at the program level. Additionally, when agreements and decisions are made outside the formal governance channels, the rules become even more obscured.

Once separate acquisition and certification governance frameworks were created for defense business systems, they necessarily drove derivative frameworks in the Services. Each Service now has a CMO and Deputy CMO who work through business transformation channels in coordination with the DCMO at OSD. In parallel, there have long been Service Acquisition Executives who work through coordination with USD (AT&L) on their respective programs. Further clouding the situation is the fact that the DCMO has been delegated acquisition Milestone Decision Authority for some business systems but not others.

The PMs and PEOs who are the "customers" of the Service and OSD processes that ideally should result in well-structured programs are not always clear whether the preparatory

[6] Major Defense Acquisition Programs (MDAPs) are the largest of the DoD's acquisition efforts with very tightly controlled statutory and regulatory requirements for planning, execution, and reporting.

meetings and reviews they are attending are driven by the acquisition side or the CMO side, and the two chains aren't always in agreement as to how to proceed up the governance path. One interviewee from the Government Accountability Office commented that it seems PMs spend more time reporting out on their programs than they do managing them. Whatever the cause, programs and Services are left to innovate their own governance procedures at the lower level. Even within the Services, PMs are faced with meeting many governance boards and complying with a diversity of policies as they get direction from multiple chains of authority above. One PEO confessed his bewilderment at the multitude of review boards:

> *"The first three or four months [on the job] I lost count of the number of governing bodies we had to report out to. How is governance of ERP[7] and IT systems done? I don't know. It's just not clean and clear...it adds to the 'fog and friction of war' and slows down progress."*

One of the side effects of this confusion about procedure and proliferation of governance boards is to default within the programs to a safer checklist approach to compliance. Interviewees from several IRBs noted that many PMs come to the reviews with a box-check mentality and an inability to articulate the business value of their investments. The former may in part be a result of the lack of clear direction and the latter is certainly related to the question of who defines value. Asking a PM to articulate how their system fits into the end-to-end business processes of the Department of Defense and may potentially meet the needs of other external stakeholders implies a level of insight and visibility that may be mismatched with their place in the enterprise.

[7] Enterprise Resource Planning systems

CHAPTER 6. CURRENT STATE IN PRACTICE: ALIGNMENT MECHANISMS

6.1 PROCESSES AND PORTFOLIOS

6.1.1 'Supported' and 'Supporting' Relationships: the Business Process and the Portfolio

Much of the focus for DoD business systems investment planning and management over the last ten years has been on the goal of implementing portfolio management (PfM) as a way to get a more enterprise-level view of its investments. IT PfM is defined by Jeffery and Leliveld (2004) as "managing IT as a portfolio of assets similar to a financial portfolio and striving to improve the performance of the portfolio by balancing risk and return." However, in contrast to instruments in a financial portfolio, which are largely independent of one another and whose benefit is almost entirely associated with their financial value, enterprise business systems exist in an ecosystem with other related systems that work together to support an integral business process. Their value is in their contribution to the overall process. The presence or absence of a small cap fund in your financial portfolio has no tangible effect on the performance and value of any other asset in your portfolio. The presence or absence of a contract payment financial system has a significant impact on your contract management system because of the interdependencies between the two in your business process.

As noted previously, however, the emphasis on business processes has only come along recently. In the broader topic of IT portfolio management, sources in the literature differ as to the specific set of best practices needed to implement a successful PfM approach, but they universally agree that aligning portfolios to business strategy is a necessary prerequisite for that success. In the context of defense business systems, each such system should be providing functionality that supports a portion of an overall business process. These processes then constitute a natural alignment mechanism for interdependent systems that deliver the end-to-end business capability in support of the strategy. In other words, the

business processes define the business system portfolios, and conversations about portfolio management should occur in the context of and not apart from the business processes they support. The following observation came from one IRB member:

> *"We're still working to build portfolios and establish portfolio management responsibility. Currently each system has to show how it maps individually to the end-to-end processes, but this needs to move to a portfolio approach where the systems supporting a particular line of business are considered together rather than as isolated cases."*

As business processes are reassessed, capability gaps can be identified in those processes that then provide the impetus for system investments and architecture initiatives. In another IRB, the interviewee noted that a business process perspective allows them to prioritize their focus:

> *We're not so interested in trying to identify the alignment of every IT system to the architecture, but if a capability gap is identified, we need to be able to deep dive on all the systems affected or involved. With a problem this big, we need to start with the pain points rather than trying to boil the ocean."*

Documenting and assessing the enterprise business processes is therefore an important precursor to establishing the business systems portfolios.

6.1.2 Stovepipes and Systems

The most common complaint to come out of the interviews was the frustration with "stovepipes" where business systems and process management occur separately in isolation across various parts of the enterprise. This manifests itself through multiple instances of the same systems, multiple instances of the same data in different, incompatible formats, systems that don't talk with one another, and a host of other ills that recur in many of GAO's reports. These stovepipes have evolved through two nested effects: Service or Agency stovepipes, and within that, functional stovepipes. The Service stovepipes play the dominant role because the forcing functions are stronger: Title 10 of the U.S. Code gives each of the Service Departments the authority to organize, train, and equip its forces in support of strategic defense capability and force structure planning. Although the National Security Act of 1947 and its 1949 amendment had created the Secretary of Defense position at the head of

the Department of Defense as a single focal point for defense capabilities (1947), and the Goldwater Nichols Act of 1986 had reduced the power of the Service Chiefs in favor of a stronger central corporate function (1986), the Services retained the budget authority and accountability for developing and supporting defense systems within their domains.

Functional stovepipes occur within specific lines of business, such as finance or human resources. Systems built entirely within one functional domain without consideration of interoperability across the domains foster duplication of investment and replication of data for common aspects of their business. An example provided by one interviewee referred to installation management and the three key data elements that define these property assets: the location, cost, and personnel associated with the installation. An asset inventory system might use one set of information codes and databases to track this data, while a finance system developed for accountability purposes might use a different set, and a human resources yet another. When the data calls come out to determine how many installations we have, how much they cost, and how many people are occupying them, how many different answers would we get? According to the interviewee,

> *"This makes it impossible to get a single, unambiguous site picture on DOD assets because everyone defines the assets and their characteristics differently."*

To their credit, OSD and the Services have embraced the concept of authoritative data sources, which enforces traceability of data validity back to a single source that all other instances of the data point back to.

Stovepipes aren't necessarily apparent unless there is a larger context within which to view them. An organization that perceives itself to be largely self-sufficient may not view itself as a stovepipe, particularly if its mission is clearly demarcated from other similar organizations. Opening the aperture to consider the organization as part of a greater enterprise allows one to see the effects of the partitioning and recognize opportunities for leverage. As stated by one senior leader,

> *"What is the enterprise? The way in which you define your enterprise defines the lens through which you address questions of optimizing your business. Moving from local domains to enterprise-wide view is a*

> *big change...it strikes at issues of personal control and ownership of the money. Functioning as an enterprise allows you to reduce duplication, but that increases interdependence across organizations and systems within the enterprise and architecture."*

Interdependence in this context implies risk that another Service on whom you have to rely for business capabilities fails to adequately account for your organization's needs or potentially fails to deliver at all. From the perspective of the Service giving up control of and resources for the business system, the benefits are not clear cut. True, the enterprise as a whole benefits long-term, but unlike commercial firms that can reward enterprise-level thinking with bonuses based not only on individual but company performance, there is no equivalent incentive to take the risk. The hedge against this risk is to champion the notion that your Service's needs are unique.

6.1.3 Adopting a Business Process Perspective

One of the earliest emphasis areas for federal government business systems investment management was to transition from a system-focused view to a business process view. The concept of business process design was first formalized by Davenport and Short (Davenport and Short 1990) and separately by Hammer (Hammer 1990). The idea centers on leveraging the power of automation and speed brought by IT to workflows that are by their nature cross-functional. The business process reform movement gained momentum in the 1990s and 2000s as a way of streamlining business operations while improving the flexibility and responsiveness of services delivered to customers. It forced firms to reassess their business strategies and align their business process to those strategies, weeding out unnecessary processes and driving cross-functional integration to reduce duplication while promoting information sharing.

When those business processes span multiple organizations within the enterprise, the difficulty is magnified accordingly. Gulledge and Sommer (2002) discussed business process management in the DoD and noted the challenges associated with holistic business process analysis in this stovepiped organizational structure. These processes are part of the fabric of the individual member organizations, representing an evolution over time in the way work gets done. Changing them in one organization to better align with standards developed

in another organization for the benefit of the larger enterprise implies expenditure of local resources with little likelihood of near term return on investment relative.

One of the far-reaching implications of this division of authority has been the bottoms-up approach the Department has traditionally taken to developing and delivering business system capabilities, with the Services looking first at what they could build or modify to meet their own needs and then thinking about how to hardwire those systems together where interoperability was required. Although the Clinger-Cohen Act identified the requirement to perform business process analysis as part of the decision scheme for approving information systems acquisitions, business process reengineering (BPR) was not institutionalized until it became an explicit prerequisite for business systems certification in Section 1072 of the FY 2010 NDAA (2010). An OSD senior leader noted

> *"We need to start first with defining the problem by reassessing the business processes first rather than thinking in terms of IT system solutions. Develop the end-to-end processes, which drives the search for process commonality in the "to-be" approach, then buy IT systems to support that."*

However, another interviewee from one of the IRBs cautioned that business process reengineering has to consider the capabilities inherent in the technology, a theme echoed in the literature (O'Neill and Sohal 1999; Reijers and Liman Mansar 2005). Doing so allows the reengineering to more fully capture the benefits of automation.

The acquisition framework reinforces this system-over-process focus. The Defense Acquisition System is organized around the program as the atomic unit of activity. The rules for planning and executing these programs are directed toward ensuring that the business case for the program is compelling, the requirements are clearly defined and achievable, the acquisition strategy is sound, and that resources for the program are sufficient to execute the strategy. It wasn't until the Business Capability Lifecycle (BCL) was rolled out in 2007 that acquisition for business systems was placed in a more holistic context that considered the end-to-end processes the systems were intended to support. The BCL was developed by the DoD's Business Transformation Agency at the direction of the Deputy Secretary of Defense in order to increase the speed of business capability delivery and improve the quality of

investment decisions. Yet even with the renewed emphasis from the BCL and the statutory requirements of the FY 2010 NDAA, the focus for business processes is still at the program level.

The DoD's most recent BPR guidance places responsibility for BPR on the business system owners, despite the fact that end-to-end business processes almost always extend well beyond the scope of the constituent systems: "if it is determined that appropriate BPR efforts were not undertaken, the appropriate Military Department CMO or DCMO shall require the program manager and senior functional sponsor(s) to develop a plan to conduct the appropriate BPR efforts, or restructure or terminate the modernization." (McGrath 2010, 2) One of the critical success factors for BPR is that it must derive from an overarching reassessment of the business strategy of the enterprise. For example, in the commercial world, a firm that is focused on achieving rapid growth and matching their agility to the demands of their customers may choose to design their business processes differently than a firm that wants to emphasize operational effectiveness in order to maximize return on assets. These are decisions that require senior strategic direction, yet the imperative to drive BPR down to the program level only ensures that individual subprocess elements will be reengineered with predictable results (GAO 1997a; O'Neill and Sohal 1999).

Another obstacle to end-to-end integration along these business processes is the lack of Process Owners to lead the BPR planning efforts, coordinate change management across the affected components and system owners, and assess the degree of performance improvement. The GAO identified this as a key enabler (1997a) and empirical research in the private sector indicated that the lack of accountable process owners for reengineering efforts and outcomes was a significant contributing factor to BPR failures (Grover et al. 1995). These process owners must be empowered to champion the effort and have some way of either influencing or compelling member organizations to sacrifice near term expedience in favor of greater enterprise performance across the full spectrum of the end-to-end process. At present, the DoD has not identified formal process owners for the major end-to-end business value streams, which impairs accountability, fragments decision-making, and creates challenges for performance assessment of the reengineered process and its constituent systems.

One potential reason for this is reluctance on the part of OSD to overreach in prescribing how the Services should spend their dollars. This contrasts sharply with private sector firms that generally have the ability to internally mandate and empower process owners. However, the FY 2005 and later Defense Authorization Acts have given OSD significant powers to deal with these constraints. As codified in the FY 2005 NDAA, the DBSMC makes business system certification approvals with recommendations from the appropriate Certification Authorities, who in turn rely on their respective IRBs to manage the precertification and acquisition reviews of each DBS. These certifications are statutory prerequisites for spending money on any business modernization effort over $1 million across its lifecycle. In effect, process owners working through the IRBs would have a significant influence on the "power of the purse" in business system development. With their end-to-end view of the core business processes, process owners at the IRB level would be the ideal choice to lead business process reengineering.

6.1.4 In Search of Clearly Defined Portfolios

As mentioned previously, the DoD began thinking in terms of capability portfolios as an outcome of the Transformational Planning Guidance of 2003 signed out by Secretary of Defense Donald Rumsfeld (2003). Although there has long been a focus on portfolios within the DoD, the understanding of how they fit into the actual work has been slow to follow. The DoD first established policy for IT portfolio management as a subset of its larger defense systems portfolios in a 2004, assigning responsibilities for IT systems supporting Joint Warfighting Capability Assessment areas, business domains, and the information enterprise (Wolfowitz 2004). These were refined in 2005 to align to the four mission areas in use today: Warfighting Mission Area (WMA), Business Mission Area (BMA), DoD portion of Intelligence Mission Area (DIMA), and Enterprise Information Environment Mission Area

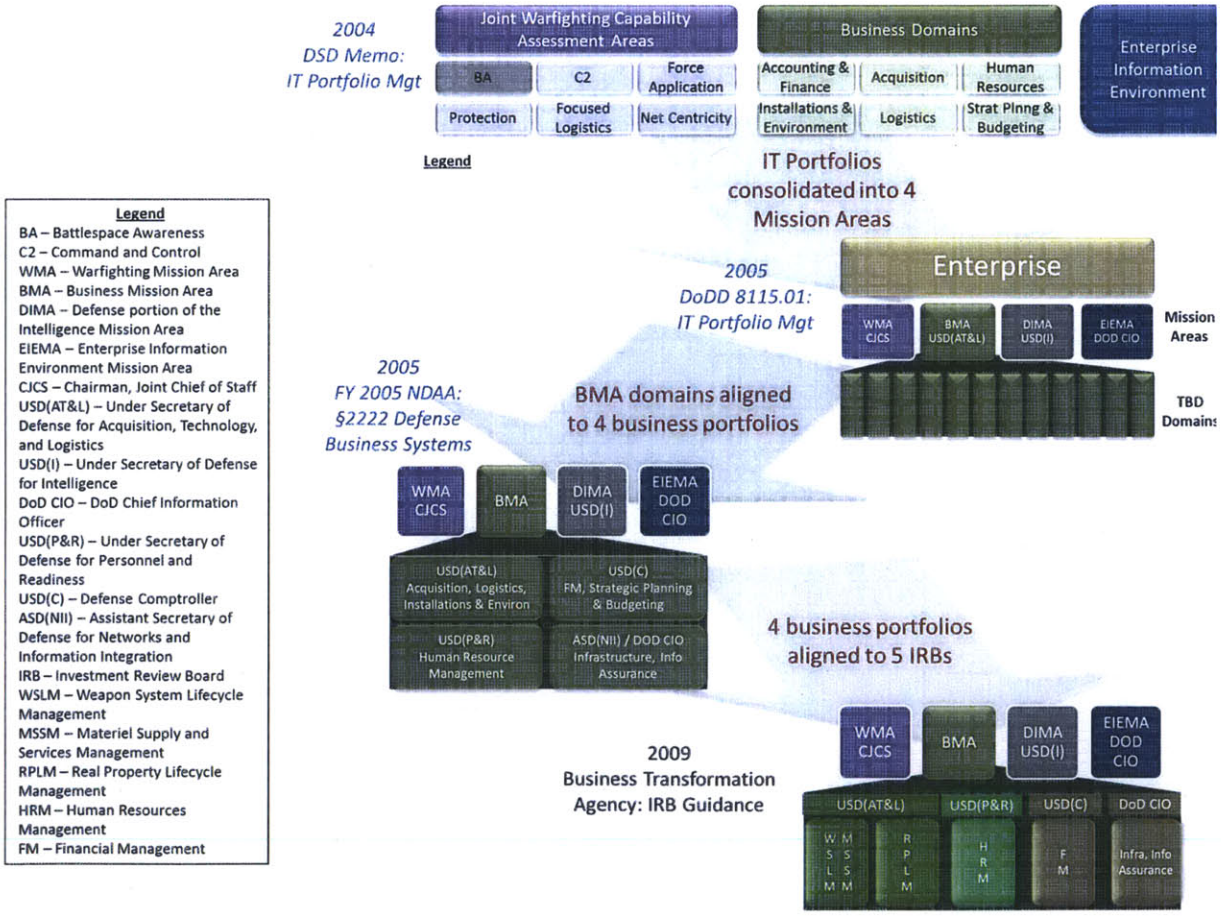

Figure 16 Evolution of defense business systems portfolios.

(EIEMA). Around the same time, the FY 2005 NDAA established portfolio accountability for all defense business systems under the BMA to four Certification Authorities as shown in Figure 16 below. After several years, the Business Transformation Agency had refined the IRB structure to include five such boards supporting the four CAs.

In parallel with the development of the business systems portfolios, the DoD had established the Joint Capability Area (JCA) construct for capabilities-based planning, investment decisions, portfolio management, and operational planning. Under the JCA Capability Portfolio Management (CPM) model, the Portfolio Managers integrate force structure planning along functional lines and advise decision-makers on budgetary decisions to support these integrated needs. In a 2006 DEPSECDEF memo, OSD identified four test

CAPABILITY PORTFOLIO AND TIER 1 JCA	CPM CIVILIAN LEAD	CPM MILITARY LEAD	SWarF LEAD*	CPM JS OPR*	FUNCTIONAL CAPABILITY BOARDS*
COMMAND AND CONTROL	ASD(NII)	USJFCOM	USJFCOM	J-3	USJFCOM
BATTLESPACE AWARENESS	USD(I)	USSTRATCOM	USSTRATCOM	J-2	J-2
NET CENTRIC	ASD(NII)	USSTRATCOM	USSTRATCOM	J-6	J-6
LOGISTICS	USD(AT&L)	USTRANSCOM	USTRANSCOM	J-4	J-4
The below boxes reference capability portfolios in interim phase through the Fiscal Year 2010 Program Objective Memorandum.					
BUILDING PARTNERSHIPS	USD(P)	Director, J-5	USJFCOM	N/A	J-5
PROTECTION	USD(AT&L)	Director, J-8	USSTRATCOM	N/A	J-8
FORCE SUPPORT	USD(P&R)	Director, J-8	USJFCOM	N/A	J-8
FORCE APPLICATION	USD(AT&L) USD(P)	JROC	USJFCOM USSOCOM USSTRATCOM	J-8	J-8
CORPORATE MANAGEMENT AND SUPPORT	DCMO	DJS	N/A	N/A	N/A

* As designated by the Chairman of the Joint Chiefs of Staff.

Legend:

ASD(NII)	Assistant Secretary of Defense (Networks Information and Integration)
USD(AT&L)	Under Secretary of Defense (Acquisition, Technology, and Logistics)
USD(I)	Under Secretary of Defense (Intelligence)
USD(P)	Under Secretary of Defense (Policy)
USD(P&R)	Under Secretary of Defense (Personnel and Readiness)
DCMO	Deputy Chief Management Officer
DJS	Director, Joint Staff
JROC	Joint Requirements Oversight Council
J-2	Joint Staff Intelligence Directorate
J-3	Joint Staff Operations Directorate
J-4	Joint Staff Logistics Directorate
J-5	Joint Staff Strategic Plans and Policy Directorate
J-6	Joint Staff Command, Control, Communications, and Computer Systems Directorate
J-8	Joint Staff Force Structure Resources and Assessment Directorate
OPR	Office of Primary Responsibility
USJFCOM	United States Joint Forces Command
USSOCOM	United States Special Operations Command
USSTRATCOM	United States Strategic Command

Figure 17 Tier 1 Joint Capability Areas. Source: DoD Directive 7045.20 "Capability Portfolio Management" (2009, p. 4)

case capability portfolios aligned to the Joint Command and Control, Joint Battlespace Awareness, Joint Net-Centric Operations, and Joint Logistics JCAs (England 2006). These were later broadened (England 2008) to nine JCA portfolios as shown in Figure 17.

Interestingly, there is no alignment of these portfolios to the business system portfolios discussed above. Since each system must be mapped to a budget line item that falls under one of the JCAs, each business system should be accounted for in the JCA governance. This implies, however, that portfolio management under the JCAs occurs in conflict with portfolio management under the IRBs and the DBSMC. Furthermore, OSD identified in its November 2010 Section 804 Report to Congress "A New Approach for Delivering Information Technology Capabilities in the Department of Defense" (OSD 2010a) that it had aligned it's IT systems into three primary portfolios: "AT&L oversees the acquisition of warfighting systems; the DoD CIO currently oversees the acquisition of infrastructure, communications, and command and control capabilities; and the DCMO oversees the acquisition of DBS." Finally, the latest OSD direction on the acquisition of defense business systems clearly identifies USD(AT&L) as the Milestone Decision Authority for all Major Defense Acquisition Program (MDAP) and Major Automated Information System (MAIS) business system programs. These apparent conflicts lead to the confusion implied in Figure 18 that arises in attempting to sort out what the portfolios are and who is accountable for them.

6.1.5 The Difficulties of Managing Asynchronous Systems

Stakeholder interviews also revealed an interest on the part of OSD to further empower PfMs to perform the "management" part of their role. In addition to the lack of a consistent and institutionalized approach to portfolio management across the core business domains, PfMs would face the challenge of the sequential nature of business systems reviews. As one senior official stated,

> *"The asynchronous nature of investment reviews through the monthly IRBs makes it hard to take a holistic look at the various investments in the portfolio to determine the extent of duplication or overlap if different systems are boarded at different times."*

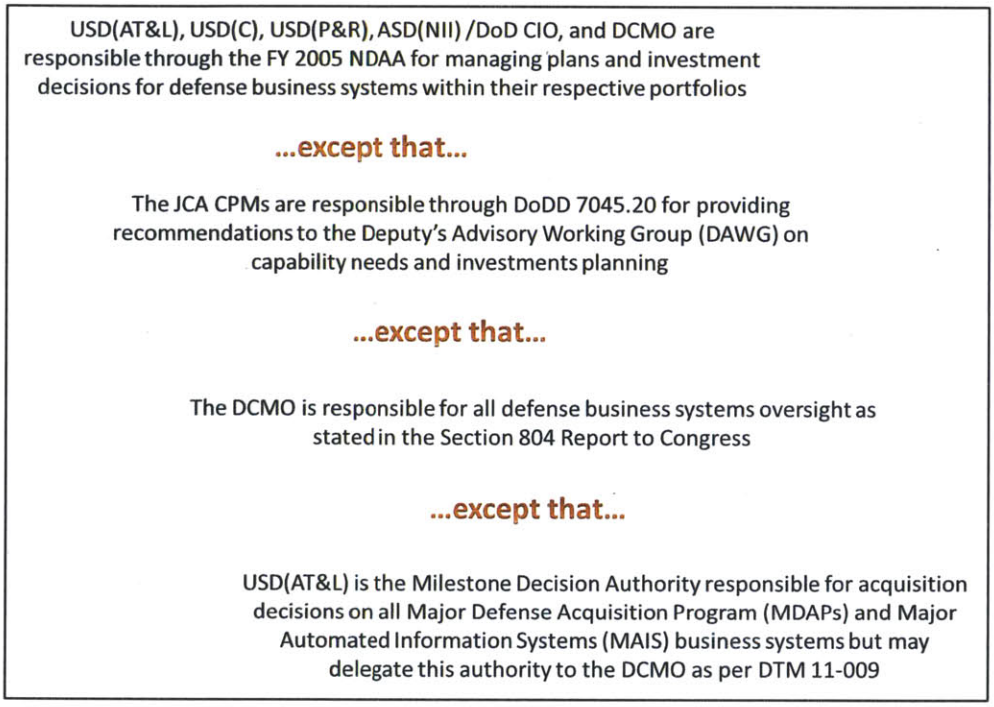

Figure 18 The Department's guidance on how portfolios are implemented and managed is not clear and at times appears to contradict itself.

It becomes difficult to compare the contributions of various like systems to the business processes and architecture when the systems are reviewed at boards that are potentially months apart. On the other hand, IRB reviews of systems are driven by the systems' readiness for acquisition or certification decisions at key points in their lifecycles, making concurrent reviews of different systems on varying timelines impractical.

One of the related concerns identified in the interviews was the inability of the IRBs to gain insight into legacy business systems already in use in the field. Additionally, without the authority to decertify legacy systems as with modernization efforts, the IRBs have had no way to manage the operational baseline systems that make up a significant portion of the integrated architectures. Ideally, a modernization would target a capability gap that exists because of old systems that are no longer able to provide the needed functionality or interoperability, or they're on technology baselines that are no longer supported. The modernization would deliver a new system or a major upgrade to replace the legacy system

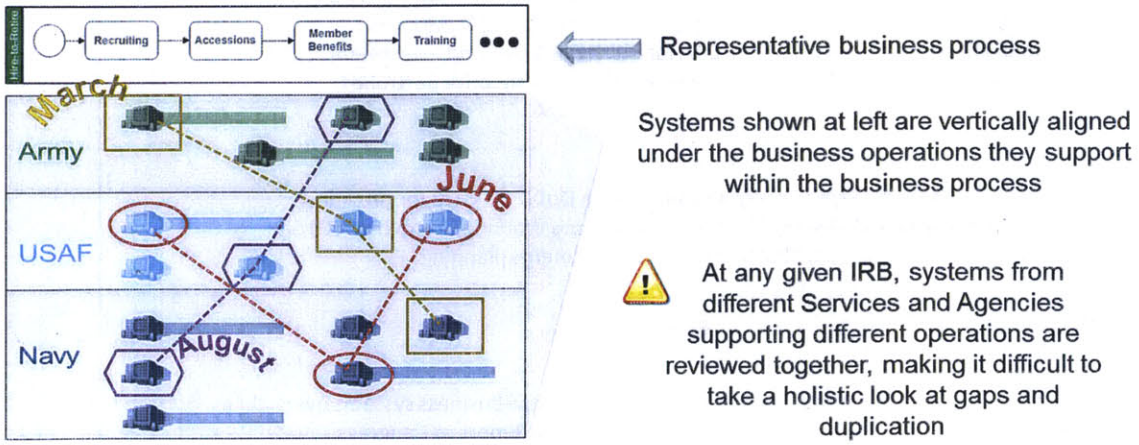

Figure 19 Notional example demonstrating asynchronous investment reviews.

and a "sunset date" could be established to decommission the old platform. However, it is rarely this clean, as captured in this view from an IRB member:

> *"We don't sunset systems. We build systems, plan for their replacements, but always seem to find a justification to keep the legacy systems around, which drives more interfaces. It's driven by the lengthy budgeting process and governance bodies such as the IRBs that only look at modernization efforts and what we're buying today. For example, we have a Procure-to-Pay business process with 118 legacy systems, but only 50 of them have sunset dates that probably aren't criteria-driven."*

From the Services' perspective, though, there may not be a perfect overlap of functionality between the old and new systems. A senior OSD leader provided the following observation:

> *"New systems typically don't overlap 100% in functionality with the systems they replace, so we end up keeping those systems longer...it's good for the business case to say that your new system can allow you to eliminate a legacy system, but in reality the system owner often finds a need for retaining the legacy capability even after the new one is online."*

Cost overruns and budget cuts can drive descoping of modernization functionality that leaves the user to choose between continuing to spend money sustaining the old systems or to go without needed capability. In general, users will choose the former. This fact isn't lost on OSD leadership, either.

6.2 PERFORMANCE GOALS AND MEASUREMENT

6.2.1 Assessing and Motivating Performance through Measurement

A common theme in assessments of defense acquisitions and business systems investment management is the pervasive lack of meaningful performance measurement. The push for broader application of measurement systems in the DoD began in the early 1990s as part of the federal government reform initiatives such as the National Performance Review and the Government Performance and Results Act (Gansler and Lucyshyn 2009). As stated by Cavalluzzo and Ittner, the purpose of the performance measurement wave of reforms was to improve Congressional insight and oversight as well as to translate the benefits derived in the private sector from augmenting standard execution metrics such as cost and schedule with outcome-based measures (Cavalluzzo and Ittner 2004).

At the highest level, performance measurement systems serve as the connective tissue between the strategic business goals and successive echelons of objectives and task execution. Alignment of strategic objectives across the enterprise is a critical prerequisite to alignment of effort, but it must be accompanied by the measurement framework to assess and motivate progress toward achieving the driving goals. When measures exist and are functioning properly, leadership has a more accurate picture of the strengths, weakness, and performance patterns. Adjustments can be made and the effectiveness quickly assessed to ensure corrections are driving the enterprise in the right direction. When the measures are inadequate or nonexistent, business decisions can be misguided or made "in the blind".

Organizations in the private and public sector struggle to build and maintain effective performance measurement systems. Some of the more prevalent challenges include "identifying appropriate goals in environments characterized by multiple and conflicting objectives, measuring performance on hard-to-evaluate or subjective goals, [and] overcoming deficiencies in information systems," among others (Cavalluzzo and Ittner 2004). Additionally, organizational differences in terminology and definitions of the quantities being measured across different parts of the enterprise can distort the information sought and conveyed in the performance measurement feedback loop. Frequent leadership turnover and the corresponding shifts in strategic focus can also prevent the maturation of robust

measurement systems. This is particularly common in federal government agencies due to the relatively short tenure of politically appointed senior leadership (Marcum 2001).

It is important to distinguish between measurement of behaviors and measurement of outcomes. The former is focused on gauging performance of activities in progress that support the realization of a goal. They assess how well these activities are being performed as a way to control the quality of the process, with the expectation that well-performing processes lead to good outcomes. However, well-executed processes don't always lead to desired outcomes, particularly if the processes aren't well-aligned to the goals.

Outcome measures, on the other hand, emphasize direct evaluation of the results. These results-based measures have gained tremendous emphasis in public sector management over the last 20 years (GAO 1994; GAO 1997b; GAO 2004b) with the recognition of the importance of answering the question "What did we actually get out of those taxpayer dollars?" The challenge with outcome measures is that there is no feedback mechanism during execution to help correct poor performance that undermines goal achievement: by the time you know you've missed the goal it's too late to do anything about it. In practice, both behavioral and outcome-based measures are used together to support regulatory reporting, control enterprise processes, make decisions, validate strategy, and motivate performance.

The DoD operates within a certain Congressional contradiction that exists because the value and importance of outcome-based measures is undermined by the statutory requirements for regular and frequent status reporting. Although this reporting can be an effective tool to strengthen oversight, it also drives DoD leadership to focus all efforts on demonstrating near-term progress that can be reported in monthly, quarterly, and annual submissions. As a result, what starts out as an event-driven, outcome-based measurement accumulates many intermediate calendar-driven milepost "events" and gives way to behavioral measurement.

6.2.2 Aligning the Goals

Lack of alignment of strategic priorities across the DoD enterprise has long been among the top planning criticisms identified by the GAO in its review of DoD investment

management (GAO 1997b; GAO 2004b; Walker 2004). The networked nature plays a strong role in the difficulties the DoD has faced over the years. In deference to the statutory authorities of the Services, the Department has allowed them broad latitude to define strategic plans for meeting the business needs that support the forces they bring to the joint fight. Yet the point to bringing them together into a common DoD enterprise is to leverage their individual domains of excellence under unity of purpose toward common objectives. Ideally, such alignment reveals economies that can be realized when common objectives can be resourced with less financial and human capital than divergent goals. These economies are even more critical in an environment of constrained resources.

Parallels exist in industry as well, where the Services might be viewed as analogous to strategic business units. Norton and Russell identify these business units as "the organizational building blocks of customer value" (Kaplan et al. 2005, p. 31). As part of the highly acclaimed and widely used Balanced Scorecard methodology, they emphasize alignment of strategic objectives within the enterprise:

> *"The key to creating organizational synergies is to ensure that the individual units are aligned around shared goals and objectives. For without alignment, there is little rationale for assembling the strategic business units into a single enterprise." (Kaplan et al. 2005, p. 31)*

Beginning in 2008, the DCMO developed the Strategic Management Plan (SMP) under the direction of Congress to link business priorities to strategic defense goals in the Quadrennial Defense Review (QDR). The SMP identifies these goals and supporting SMP Objectives along with Performance Measures (metrics) for each, and every objective is mapped to a DoD Strategic Goal and an accompanying DoD Objective. Also included in the SMP are listings and brief descriptions of Service priorities and goals. The Services have established linkages from their priorities back to the QDR, but in reviewing the SMPs from each of the last 3 issuances, it is difficult to trace clear alignment from the DoD Business Goals to the Service Business Goals (DCMO 2008; 2009; 2011b).

Table 3 shows the alignment of Service goals to DoD business goals identified in the SMP. In some cases, Service goals included one of more supporting objectives that partially addressed a DoD business goal and were presented as partial alignments in gray text. Among

the three Services, the Navy goals appear to align well to the SMP goals, while the Army and Air Force goals appear to map only partially. "Support the All-Volunteer Force" was the only business goal where all three Services included goals with unambiguous linkages to the DoD goal. Even looking down the columns under "Support Contingency Business Operations" and "Reform the DoD Acquisition and Support Processes" where all three had some degree of alignment to the goals, it is hard to identify a consistent theme. Clearly, the Services have divergent missions that require different focus areas, but there could be significant areas of common interest that should trace directly and unambiguously back to an overarching DoD business strategy.

6.2.3 Placing an Emphasis on Better Business Operations

As enacted in the FY 2008 NDA (2008), the SMP is both a contract between the DoD and Congress and a communication tool to the enterprise. It represents the identification of key focus areas that the Department commits to addressing and the means by which both the DoD and Congress will know whether that commitment is being met. The contractual commitment is a forcing function for achieving the goal because defense resource decisions are made on the basis of goal achievement as seen through the eyes of the Armed Services Committees. Yet strategic plans should also be communication tools, creating alignment by explicitly identifying priorities and removing goal ambiguity throughout the enterprise.

Figure 20 Service priorities are driven by QDR priorities with less clear traceability to the SMP.

	2011 SMP DoD-Level Business Goals					
	Support the All-Volunteer Force	Support Contingency Business Operations	Reform the DoD Acquisition and Support Processes	Enhance the Civilian Workforce	Strengthen DoD Financial Management	*Service-Specific Priorities*
	Service Goals Identified in the SMP					
Army	1. An All-Volunteer Force of High Quality Soldiers, Civilians, and Leaders; 3. Soldiers, Equipment, and Units Restored and Reconstituted for Full Spectrum Operations	4. An Agile, Disciplined Warrior Team that Dominates Across the Spectrum of 21st Century Operations	4. An Agile, Disciplined Warrior Team that Dominates Across the Spectrum of 21st Century Operations	1. An All-Volunteer Force of High Quality Soldiers, Civilians, and Leaders; 3. Soldiers, Equipment, and Units Restored and Reconstituted for Full Spectrum Operations		2. Trained and Ready Units Delivered on Time for COCOMs; 4. An Agile, Disciplined Warrior Team that Dominates Across the Spectrum of 21st Century Operations
Navy	4. Optimize the total force management capability to provide strategic workforce management of DON military, civilian and contractor personnel across the Department	1. Transform DON business operations; 3. Identify and Capture Organizational and Operations Efficiencies within the DON to transfer "tail to tooth."	2. Successfully deliver DON Business Systems through improved program execution and management; 5. Deliver acquisition excellence	4. Optimize the total force management capability to provide strategic workforce management of DON military, civilian and contractor personnel across the Department	6. Improve financial management and achieve audit readiness	7. Improve the DON's energy posture by reducing fossil fuel use and increasing the percentage of energy derived from alternative sources
Air Force	2. Develop and care for Airmen and their families	3. Modernize Air Force air and space inventory, organizations, and training	3. Modernize Air Force air and space inventory, organizations, and training; 4. Recapture acquisition excellence		3. Modernize Air Force air and space inventory, organizations, and training	1. Continue to strengthen the Nuclear Enterprise; 5. Increase energy efficiency by reducing aviation fuel use, installation energy intensity, and vehicle fleet petroleum

Table 3 Strong Alignment in black text, Partial Alignment in gray text; numbers denote goal order as listed in the SMP.

Many of the interviews indicated a desire to shift to a more holistic business process perspective, but in reviewing the SMP, its Objectives, and their associated measures, the emphasis is still on systems. Although there are a few references to metrics and initiative for improving core business processes and standardizing data, they are distributed throughout the document, diluting the message that improving planning is important too. One of the common criticisms of ineffective performance measurement systems is that they fail to align the metrics to the organization's business processes (Neely 1999). Absent from the SMP are goals and objectives related to completing definition of common end-to-end business processes across the Department and establishing aligned portfolios. There is therefore no contractual forcing function within the SMP to drive the collective sense of urgency, nor a focused message reinforcing leadership's emphasis on the importance of these reforms.

To illustrate this point, the DoD's 15 core business processes are identified in Chapter 2 of the SMP (DCMO 2011b), but there are no Objectives associated with further defining these processes, moving the Department toward standard processes, leveraging common technologies, or rationalizing systems to reduce duplication. Nearly all Performance Measures related to improving business practices focus on business system program execution rather than on improving the planning practices that lead to investment decisions.

6.2.4 Aligning Measures to Strategy

Linking strategic objectives is an essential step toward achieving alignment of purpose, but those objectives must be measured and the measurement must reflect the outcome or behavior desired in order for the enterprise to determine if it's achieving the goals. Three problems can occur with respect to reinforcing objectives through performance measures. First, leadership can fail to measure a goal at all. Besides the obvious challenge this creates for controlling the direction and efforts of the enterprise, it can signal that the goal is unimportant. Second, having too many metrics places an overemphasis on intermediate processes and dilutes focus that should otherwise drive toward specific outcomes. This can indicate that leadership doesn't know what's really important but they're hoping to catch whatever it is through an abundance of metrics. The third issue revolves around the choice of measures and the potential that the metrics are misaligned from the goal.

The message conveyed in this circumstance is that what leadership really values is not what is espoused in the strategic goal, but some other objective that may not headline as well.

As an example of this third issue with strategy-to-measurement alignment, one of the SMP goals above is to "Support Contingency Business Operations". The definition for this goal in the SMP is as follows:

> *"Defense business operations must provide adaptable, responsive, effective support for the warfighter. Accordingly, the multifaceted objectives, measures, and initiative in this Business Goal apply lessons learned on the battlefield, adapt industry best practices to support deployed warfighters, and provide the flexibility needed to address new, future challenges at home and overseas. Because of the multifaceted nature of this Business Goal, it supports several DoD Strategic Goals."(DCMO 2011b, p. 13)*

This goal has an SMP Objective to "Provide Effective Business Operations to Support Overseas Contingency Operations". On the surface, one might expect from the aforementioned description to see reference to a full spectrum of metrics measuring logistics support[8] in theater or perhaps turnaround time to field gap-fill capabilities on Joint Urgent Operational Needs[9] among others, but the only metrics identified were "Percent assigned of required Contracting Officer Representatives (CORs) supporting Afghan contingency operations", "Percent of in-theater Army central disbursements, using cash", and "Percent of contract actions tied to entitlements and disbursements in the systems of record". The focus appears to be much more directed toward addressing the contingency contracting oversight deficiencies implicated in the Congressional reports on wasteful defense spending in Iraq and Afghanistan (Commission on Wartime Contracting 2009). Ironically, one of the recommendations offered by the Commission was to resolve internally conflicting business systems and processes, but that objective and accompanying metrics don't appear in the SMP.

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[8] Logistics support is identified in an objective under a separate SMP Goal to "Reform the DoD Acquisition and Support Processes".

[9] Joint Urgent Operational Needs, or JUONs, are a special category of warfighter requirements for rapid development and fielding of critical capabilities needed in theater. These acquisitions receive special dispensation to avoid many of the usual statutory and regulatory procedures that would otherwise slow down the fielding significantly, but are limited in scope to only what is needed to temporarily fill the urgent requirement until a formal acquisition effort can deliver a permanent solution if needed.

6.2.5 The Language Gap and Its Effect on Performance Measurement

As mentioned previously, the evolution of service cultures has led to Service-specific business data definitions and terminology. These variations impact performance measurement in several ways. First, when new metrics are established, each Service or Agency must interpret the requirement, mapping into its own ontology in order to create its own version of the metrics. This may create a gap between what was intended by OSD to be collected and what the Services believe is needed. The data collected in this fashion is passed back to OSD who then must reinterpret back, introducing another opportunity for translation error. In the absence of standardized metrics, the IRBs will sometimes accept the Service measures as they are and forego the translation as described by one IRB member talking about architecture compliance by the programs:

> *"From a metrics perspective, we rely on the programs to lay it out for us and we evaluate them based on what the system's supposed to do and what criteria were considered, and we might be a little critical if there's not enough plus points that suggest this was the right decision, but we're probably not going to say anything negative about it."*

In this case, the IRB may not get the information it felt it needed, but what it got gives them a general sense of understanding of the condition the metrics were intended to describe. If that understanding is imperfect, the IRB sacrifices a degree of control in "taking the program's word for it."

In addition to the impact of the errors on the IRB's understanding of the program's viability, collating the information in its diverse formats from the different Services and programs can be very manually intensive. As an example, defense real property accounting has historically undergone labor-intensive annual reconciliations to accurately count the facilities in use by defense organizations worldwide (Krieg 2006) rather than relying on integrated real property databases. When data definitions vary, manual data calls in support of performance measurement are the fallback position, with deconfliction and normalization of the results consuming significant resources and time.

Several IRB members expressed the desire to establish a standards compliance "litmus test" that would require systems to demonstrate standards compatibility through data

transaction tests. An IRB representative compared the idea to testing in traditional weapon systems:

> *"We're much better at checking boxes rather than verifying that systems address capability gaps and meet standards. What we need is an 'Operational Test' for business systems to verify systems are complying with the architecture and standards through test...did the system reference the proper data types according to established standards to allow for data interchange and interoperability?"*

This operational test would eliminate the ambiguity of translation errors, an effective approach for low level technical measures that would roll up to improve the accuracy of measuring progress in bringing the Department's systems into alignment with the business enterprise architecture.

Establishing that common lexicon is inherently more difficult across public administration networks when organizational identity and cultural differences are celebrated as they are among the Armed Services. Fiol (2002) noted within institutions individual members' identification with the institution aggregates to amplify that institutional identity, and a stronger institutional identity engenders greater degrees of individual member identification. This cycle of reinforcement is a strength upon which stable institutions build to maintain coherence and resilience, but it also serves to inhibit transformation, particularly when that transformation is viewed as externally imposed. Changing the language of the institution's business processes can be very disruptive as observed by an IRB member drawing comparisons to military uniforms:

> *"We spend a lot of money on uniforms...we could save a lot of money—well, not a lot in the grand scheme of things, but we can't [adopt a common uniform] because nobody wants to give up their identity. If it's that emotional for a uniform, think how much more emotional it would be to make everyone use the same business process?"*

This example highlights just how powerful organizational identity can be in resisting a disruptive impulse. However, Fiol also notes that language can be used to help transform the institution because of its dual role as an artifact of the institutional identity and the means of expressing it (2002, p. 655). Adopting a common business process language in concert

with a consistent leadership message reinforcing common business processes where applicable is a powerful and essential step for achieving that goal.

The IRBs are making gradual strides in standardizing data structures, but the Service CMOs can help by identifying their own Service Business Process leads that support the IRB Process Owners in establishing and institutionalizing terminology and definitions.

6.2.6 The Challenges of Leadership Turnover

Leadership turnover is a challenge that all enterprises face from time to time, but in public sector organizations, change at the top occurs more frequently. A study of political appointee turnover in federal government drawn from Office of Personnel Management data over the period from 1982 to 2003 revealed an average tenure of 2.8 years in executive branch departments (Wood and Marchbanks III 2008)[10]. In comparison, a similar study of Chief Executive Officer (CEO) tenures in large U.S. corporations indicated average time in position of just under 7 years (Kaplan and Minton 2008).

In public sector organizations, however, top leadership is often engaged primarily in managing external relationships (Boyne et al. 2011), leaving deputies and other elements of the senior management team to control the organization. Some would argue under these conditions that leadership turnover should have little effect on performance. Contingency theorists, on the other hand, would contend that leadership has a more substantive impact but that the circumstance of the organization must be considered. Top management change can be good or bad depending on the prior performance of the organization: poor execution requires change, but disrupting high-performing teams is destructive. Unfortunately, prior studies in the literature focus a microscopic lens on the issue of leadership change, looking only at individual changes and examining the performance just before and just after to identify impact and causality. So how does this turnover impact organizational effectiveness in the DoD and its ability to manage its performance?

[10] Interestingly, the Wood and Marchbanks III study revealed that the prospects of private sector employment and compensation following federal government service and the degree of conflict between the executive and legislative branches were the two most important determinants of appointee tenure. Assuming the model is valid, it would be interesting to see whether the economic and political climates of late 2011 will produce longer or shorter tenures.

Clearly, frequent leadership turnover is disruptive, whether for good or bad. Leaders impact defense organizations in a number of ways, both directly and indirectly. The most easily identifiable artifact is the translation of higher level enterprise strategies into organizational strategies. When new leaders assume their roles, they must internalize and interpret prior strategic goals and recast them in a form which they believe is consistent with the direction they received in accepting the job. If they are taking over during a period of poor organizational performance or heightened oversight attention, there is usually an impetus for change in goals. In high-performing organizations, the new leader may wish to create some distinguishing positive impact on the organization that is directly attributable to them. Any change in strategic goals must be accompanied by a change in the associated measures, which destroys the pedigree of prior data collected on obsolete objectives. It also means that new metrics must be devised, communicated, clarified, and operationalized through new collection mechanisms.

Leaders also impact their organizations through the tacit knowledge of the internal and external networks they develop. When that leadership changes, the usual absence of overlap at the top and the difficulty of explicitly conveying tacit knowledge translates to the need for each new leader to rely heavily on their own preexisting networks or start from scratch. Internal network understanding is crucial for effecting lasting transformation within the institution, while external networks must be activated in order to secure resources, create new opportunities, and defend against threats. As a leader develops experience with and understanding of the organization, they augment the formal measures with their own informal indicators of performance. The absence of these indicators for a new leader may obscure the context within which the formal measures derive meaning.

Finally, leaders often, though not always, act to surround themselves with their preferred management staff. Changing other members of the top management team can degrade knowledge continuity and may otherwise repeat the cycle of disruption described above. In organizations where the top position is externally focused and the deputy positions are managing day-to-day operations, replacing both drives the need to reestablish bidirectional trust with internal and external stakeholders simultaneously. The internal organization may see that disruption as an opportunity to recast prior adverse performance

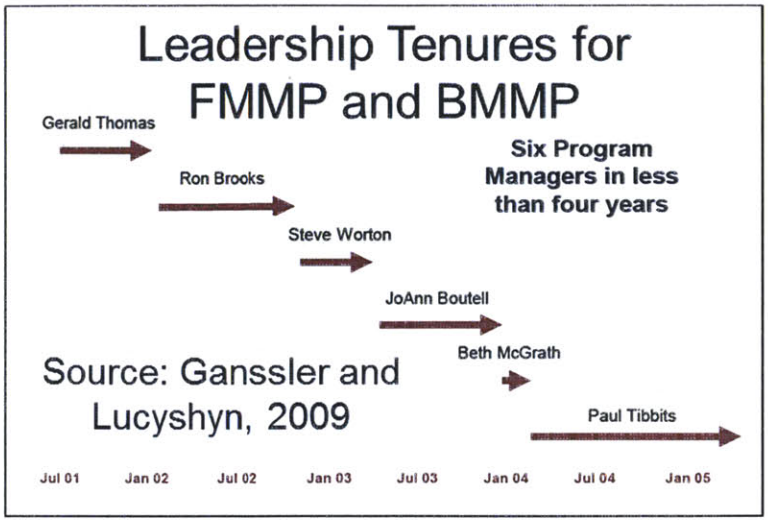


Figure 21 Lack of leadership continuity hampered the DoD's Finance and Business Management Modernization efforts in the early 2000s.

assessments in a new light. Without the informal context mentioned above, the new management team may not fully grasp the implications of the formal measures they've inherited.

Bringing the focus back to defense business enterprise, there is relevant recent experience that shows leadership turnover has impacted performance in defense business transformation efforts. In 2009, Gansler and Lucyshyn pointed out that the DoD's Business Management Modernization Program (BMMP) was hampered in its goal of achieving real efficiencies by a steady progression of six different managers in five years as shown in Figure 21 (Gansler and Lucyshyn 2009). The BMMP expended over $400 million but fell well short of meeting its stated goals, and the objectives of the program were then subsumed within the BTA upon its creation in 2005. The BTA was led for the first two years by two political appointees, then Deputy Undersecretaries of Defense for Business Transformation and Financial Management, Paul Brinkley and Tom Modly, respectively. However, the DoD anticipated the damaging effects of the regular pace of administration changes on long-term transformation and established the BTA Director position as a career civil service billet. Ironically, the BTA was designated for elimination as part of cost-cutting defense efficiencies announced by the Secretary of Defense on August 9, 2010 (OASD (Public Affairs) 2010).

Figure 22 Quadrennial election cycles and the participation of two separate branches of government in appointing senior leaders creates a highly compressed performance period that influences leadership focus.

The GAO has suggested that the position of Chief Management Officer currently executed by the Deputy Secretary of Defense be separated out and held by a career civil servant with a term of five to seven years in order to provide dedicated leadership attention and a greater degree of isolation from the political tides (Walker 2006). Although leadership turnover is common in private sector firms as well, it is built in as a predictable and largely foregone conclusion in leadership positions within public administration networks. The GAO has suggested that the position of Chief Management Officer currently executed by the Deputy Secretary of Defense be separated out and held by a career civil servant with a term of five to seven years in order to provide dedicated leadership attention and a greater degree of isolation from the political tides (Walker 2006). Although leadership turnover is common in private sector firms as well, it is built in as a predictable and largely foregone conclusion in leadership positions within public administration networks. As alluded to in Figure 22, the quadrennial election cycle imposes significant constraints and potential disruption for politically appointed leaders. This phenomenon will be discussed in more detail in the upcoming incentives section.

Given that a Deputy CMO position has already been codified in law as a politically appointed leadership position, it would make sense in this context to redesignate this position as the CMO and convert it to career civil service using similar provisions for longevity that are currently required for Program Managers who must sign tenure agreements in major acquisitions (Krieg 2007b). Special authorities would be needed to offset issues of rank disparity relative to the CMO's politically appointed—and therefore, senior—peers in OSD.

6.2.7 Did We Get What We Wanted?

Another area that has gained focus both in the public and private sector is the value of post-implementation reviews (PIRs) as part of the overall measurement framework. The PIR is a results-oriented assessment of the degree to which a completed program has delivered against the expectations of the user. The CCA of 1996 had required federal acquisitions to include a PIR process, and the GAO continued to highlight this industry best practice in its periodic reviews. However, a 2007 survey of over 1500 private sector firms in 60 countries revealed that establishing a strong PIR framework is not a simple task: only 24 percent of respondents indicated they had effective programs (Weill and Ross 2009).

Nicolaou (Nicolaou 2004) identified the importance of PIRs in business system implementations along five factors. First, the reviews are useful for reassessing the fit of the investment in the long-term strategy, providing opportunities to plan improvements that maintain alignment with evolving goals. Second, the PIRs of the systems also forced a reassessment of the underlying business processes of the organization. Similarly, the third benefit was found in identifying misalignments of business system processes with organization practices, allowing for correction of the implementation to improve that alignment. Fourth, the review was important for assessing the degree to which the investment provided the anticipated value. Finally, PIRs were found to be helpful for knowledge capture and transfer across the organization.

What has most plagued DoD in the adoption of PIRs is the extreme length of its programs. The Defense Science Board reported that major IT investment programs took an average of seven and a half years to deliver initial operational capabilities (Defense Science Board 2009). Clearly, conducting PIRs every seven or eight years when user requirements, technologies, and policies change much more rapidly would not promote actionable knowledge capture. Recent legislative and regulatory changes aimed at drastically reducing delivery timeframes of business systems down to 12 to 18 month cycles through incremental development should provide much more frequent opportunities to incorporate lessons learned into course corrections within the life of a multi-increment program.

6.3 INDIVIDUAL AND ORGANIZATIONAL INCENTIVES

6.3.1 Theories of Incentives

Organizational theories have long acknowledged the importance of formal and informal incentives in motivating desired behavior or avoiding undesirable actions. There are both descriptive and prescriptive theories: some classify incentives and the behaviors associated with them (Clark and Wilson 1961), while others present models that attempt to identify optimal incentive strategies based on the nature of the organization (Englmaier et al. 2010). The other important distinction is between individual and organizational incentives. The more commonly explored individual incentive theories focus on ways to influence employee behavior, while organizational incentive theories look at the motivational factors linked to the behavior of the organization in relation to other parts of the enterprise. In cases where individuals are in a position to substantively affect organizational performance, such as leadership and other key senior management positions, the two regimes intersect.

Clark and Wilson described three types of incentive systems at work in organizations: material, solidary, and purposive (Clark and Wilson 1961). Material incentives include financial instruments or benefits that can be easily translated into financial gain. These would include salaries, stock options, and paid time off. Note too that this category of incentives includes the motivation to avoid adverse changes such as being fired or demoted. Solidary incentives refer to those accrued by virtue of association with the organization. Camaraderie, social belonging, and a sense of distinctive identity are examples. Finally, purposive incentives derive from the sense of achievement in realizing some greater enterprise goal. Charitable organizations are often cited in this category. Although not exhaustive, this framework opens the door to looking at how incentives are used in theories of organizational dynamics. One of the more popular constructs falls under the broad heading of Agency Theory.

Agency Theory attempts to describe behaviors that occur in situations of interdependency between members of an organization, and in particular when the parties involve have divergent goals and views toward risk. It derives its name from the relationship that arises when "one party (the principle) delegates work to another (the agent)" (Eisenhardt

Key propositions in Principal – Agent employment contracts	
Agents are more likely to act in the Principal's interest if the contract of employment is outcome-based	*A more risk-averse Agent is more likely to respond favorably to a behavior-based contract than an outcome-based contract*
Agents are more likely to act in the Principal's interest if the Principal has the means to verify the performance of the Agent[1]	*A more risk-averse Principal is more likely to favor an outcome-based contract than a behavior-based contract*
Monitoring systems support behavior-based contracts and incentives but work counter to outcome-based contracts	*Tasks in which the behavior of the Agent can be encoded into the task specification ("task programmability"), such as in routine retail sales jobs, are better suited to behavior-based contracts*
Outcomes are more uncertain under behavior-based contracts and incentives than under outcome-based contracts	*When outcomes are easily measured, outcome-based contracts become more effective*
The lower the degree of conflict in goals between the Principal and Agent, the less motivationally effective becomes the outcome-based contract	*Longer term employment relationships favor behavior-based contract where the Principal can come to know the Agent's behavior patterns better, and shorter term relationships structured as outcome-based contracts will benefit the Principal*
[1] (Added caveat) The agent must be aware that the Principle is monitoring for this effect to occur.	

Table 4 Relationship of Agent behavior to employment contract type for various circumstances (Eisenhardt 1989).

1989). In Agency Theory, the agent is presumed to always be acting in his own self-interest. Since those interests diverge from the principal's, various forms of the theory attempt to identify the effects that different forms of incentives will have in modifying self-interested behaviors that don't align with the principal's goals. Eisenhardt highlights that incentives can be either behavior-based or outcome-based, and she makes several interesting observations about the relationship of these incentives to risk tolerance in the principal and agent as well as the principal's approach to monitoring the agent. She makes the propositions listed in Table 4 above.

Similarly, Baker et al and Gibbons and Wallman looked at different forms of incentive contracts to identify strategies for improving the effectiveness of incentives. They looked at situations where the Agent's measured performance may be different than their actual contribution to the firm. When the incentives are attached to the measured performance, the Agent is incentivized to work hard to increase measured performance. When there is at best a weak correlation between measured performance and value contribution to the firm, then strong performance incentives can actually be counterproductive (Baker et al. 1988, p. 597; Gibbons and Waldman 1999, p. 2287).

Tirole examined non-monetary incentives in the context of public sector civil servants (Tirole 1994). In that environment, career aspirations and reputation concerns outweigh monetary incentives and drive civil servants to cast their performance in the best light, even if it means misleading others about their abilities. He goes on to state that given multiple organizational goals, the civil servant will expend the most effort on the subset of goals that most impact his performance ratings, neglecting the others to the extent that this also doesn't adversely impact his performance assessment (Tirole 1994, p. 11).

At the same time, incentives play themselves out at the institutional level as well. This is best exemplified by longstanding interservice rivalries, where the Service Departments continually struggle against one another for mission relevance and obligation authority. Examples from the post-Cold War drawdown and subsequent preparations for Afghanistan and Iraq in the early 2000s present the intense political maneuvering to influence policy and preserve resources (Flynn 2011).

6.3.2 Intersecting Theories of Organizations and Decision-Making

An incentives view of the enterprise is essential to understanding what motivates the behavior of leaders and other key decision-makers, but there are other theories that bear on these same phenomena and can illuminate through different lenses. Behavioral theory of organizations, bounded rationality, and bureaucratic politics theory all provide some measure of descriptive power and will be discussed, albeit briefly, in this section.

Cyert and March (1963) presented the behavioral theory of the firm as an empirically based model for how organizations make decisions about which goals to pursue, how to pursue them, and how to learn from the outcomes. An important theme in this model is the tendency for firms to avoid uncertainty in goal-setting and environmental contexts. The behavioral theory holds that firms avoid goal uncertainty by emphasizing short-term decisions that react to near-term needs. This leads to an equilibrium condition whereby today's fire-fighting takes precedence over strategic planning for tomorrow. In the environment, firms seek to minimize the external uncertainties by negotiating limits to the important determining variables with external stakeholders, thereby reducing the number of unknowns against which they would need to plan. An application of this view to the defense

context might be an expectation by the Services that, within a small range of variability, the ratios of their respective budgets will remain fairly constant.

The behavioral theory also posits that decision-making follows a problem-centered method where decisions occur principally to address the failure of the firm to achieve a stated goal. The search for a course of action that solves the problem starts first in the vicinity of the symptoms of the problem or with variations to the current approach that is failing. The search only expands beyond these comfort regimes when necessary, and the problem is solved either by finding the "right" solution or by relaxing the goals to reflect what can already be achieved. When measuring performance against those goals, organizations learn to pay attention to some measures and not others, and in the long run adapt their measurement schemas to present their performance in the most positive light.

Bounded rationality was pioneered by Simon (1956) in the mid-1950s as an alternative to strict rational theories that assumed perfect information and perfect processing of that information in the decision-making of organizations. The "boundedly rational" decision-maker does not have at his or her disposal all the information necessary to make the decisions they face, nor do they have the mental computational ability to foresee all the implications of all the potential courses of action available. The theory argues that organizations and their leaders establish levels of aspiration that describe how good they need their decisions to be to "do the trick". Once they find an alternative that meets this threshold, their search for solutions stops and they proceed with the chosen course of action, a behavior referred to by Simon as *satisficing*[11]. At a macroscopic level, this theory allows for uncertainties in information and the use of simple decision-rules to allow the decision-maker to move forward given that reality.

Finally, bureaucratic politics theory (Allison and Halperin 1972) provides a more nuanced interpretation of the organization, not as a monolithic single actor, but as a bureaucracy of individuals with conflicting goals continually negotiating the goal-setting and decision-making processes:

[11] In his paper, Simon coined the term to describe the process of satisfying the need for a solution to a degree that suffices given the suboptimized aspirational criteria, hence "satisficing".

> *For those who participate in government, the terms of daily employment cannot be ignored: government leaders have competitive, not homogeneous interests; priorities and perceptions are shaped by positions; problems are much more varied than straightforward, strategic issues; the management of piecemeal streams of decisions is more important than steady state choices; making sure that the government does what is decided – and does not do what has not been directed – is more difficult than selecting the preferred solution.(Allison and Halperin 1972, p. 44)*

Decision-making is not an autocratic exercise by an individual leader. Rather, key individuals in certain positions wield specialized knowledge and powers accessible to their positions and networks to influence decisions according to "national security interests, organizational interests, domestic interests, and personal interests" (Allison and Halperin 1972, p. 48). Problems are viewed both from the viewpoint of the individual's position in the enterprise and through the filter of their interpretation and superposition of these interests.

Allison and Halperin also make several observations about organizational interests. First, these interests are anchored by the organization's need to protect its autonomy of execution for the missions it associates with its identity. Second, organizations compete for missions and the resources to achieve them. Finally, organizations avoid adopting positions that necessitate collaboration and coordination with other organizations (Allison and Halperin 1972, p. 49). With respect to the timeline of their focus and planning, individuals in senior positions, particularly appointees, have very near-term interests on any particular issue. Those who associate more strongly with their organization by virtue of career progression and longevity within it tend to have longer horizons.

	Principle-Agent	Behavioral Theory	Bounded Rationality	Bureaucratic Politics
Timeline of Leadership's Focus	Behavior-based employment contracts emphasize short horizons; outcome-based agreements favor long-term focus	Desire to avoid uncertainty in planning drives leaders to focus on short term decisions addressing near-term needs	Limited information and problem scope ambiguity forces a practical emphasis on dealing with the more certain, near term aspects	Senior leaders and political appointees will focus near term; career civil servants that grew up in the organization will have longer term focus
Performance Monitoring	Continuous and frequent monitoring undermines outcome-based goals in favor of performance indicators	Organizations learn to pay attention to and emphasize those measures that portray their performance in the most positive light	*Not Addressed*	Decisions are generally not amenable to monitoring by senior leaders to ensure proper implementation
Decisions and Actions	The leader of an organization will seek to maximize their performance or outcome based incentive equation through their decisions and actions	Organizations make decisions to address failures in goal achievement, and their search for solutions centers around the problem symptoms and familiar alternatives; goals are relaxed when solutions can't be found	Decision-makers satisfice by choosing the first suboptimal course of action that meets the decision quality threshold, starting with familiar approaches and past experience	Decisions and actions are the outputs of "games" in which key participants are players working first to influence the decision according to their interests and then to implement decisions in the most favorable way possible
Cooperation Among Organizations	Cooperation is incentivized if it is explicitly measured as part of a performance based contract; otherwise, only if essential to the achievement of a necessary outcome	Cooperation is used to constrain the variability in the external environment, thereby reducing uncertainty	Conservatism and reluctance to cooperate arises out of fear of being taken advantage of by others with better information	Cooperation is a necessity used to build interest coalitions or to avoid creating enemies in other parties that may have some influence over longer term interests

Table 5 Comparison of enterprise decision-making factors through the Principle-Agent, Behavioral Theory, Bounded Rationality, and Bureaucratic Politics lenses.

In the following sections, both individual and organizational incentives are explored in the DoD with an eye toward an assessment of their impact on planning and management of DBS investments. The field of incentives is substantially large and complex, and no attempt is made here for a comprehensive analysis. However, incentives play an important role in defense investment planning and management and have been documented by those within and outside the Department.

6.3.3 Individual Incentives

Borrowing from the Principle-Agent theory, we cast the politically appointed leader in the role of the agent. On the surface, one might expect to draw the simple conclusion that the Principle in these cases is the sitting President who appointed them, or perhaps other political appointees to whom they are subordinate. However, in order to appreciate the incentives at play for these leaders and their senior staff, it's worth noting the environment in which they operate. Politically appointed leaders in the executive branch serve at the pleasure of the administration, and the timelines under which they attain those positions can have a strong influence on their focus. In addition, political appointees that undergo Senate confirmation are subject to an extensive vetting and review process prior to nomination as well as substantial scrutiny during the confirmation process.

Sen. Joseph Lieberman described the current state of affairs in his June 22 statement on the floor of the Senate earlier this year as he introduced legislation to reform the confirmation process.

> *"One hundred days into President Obama's Administration, only 14 percent of the full-time Senate-confirmed positions in his Administration had been filled. And after 18 months, 25 percent of key policymaking positions were still vacant (Lieberman 2011)."*

A look at the data supporting Sen. Lieberman's position reveals that the problem is worse for agency heads and their deputies than for higher cabinet-level positions. As shown in Figure 23, the average time for an agency head to get through the vetting and approval process is just under 250 days, growing to over a year for deputy positions. Combined with the four-year election cycle and the average tenure of 2.8 years for politically appointed positions in the executive branch (Wood and Marchbanks III 2008), there would seem to be intense pressure for near-term results.

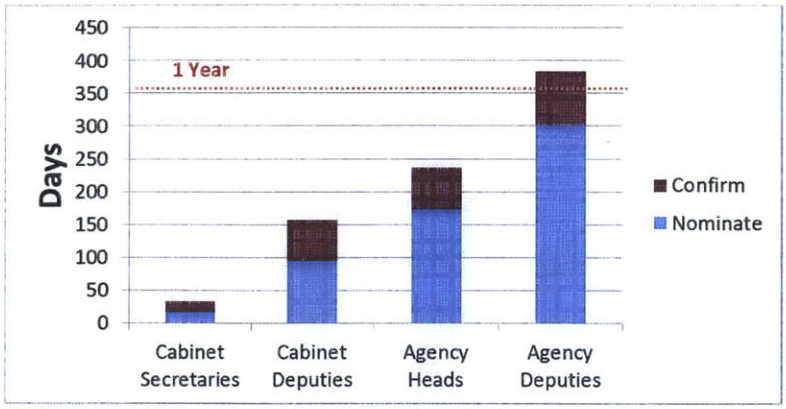


Figure 23 Average time to nominate and confirm politically appointed positions in the executive branch based on data from 1987 to 2005 (Lieberman 2011).

Tirole's view of career interests as a primary motivator for civil servant behavior would seem to indicate a curious dual-allegiance problem for politically appointed leaders and their deputies. On the one hand, they serve an administration that has expectations for its bureaucrats to implement policies in line with its values. Given that the President has the power to nominate and remove appointees, there is a strong career incentive for appointees to support the political agenda.

However, nominees to key leadership positions also face Senate confirmation. Once confirmed and appointed, the agency leader's performance and ability to satisfy Congressional interests will be tested in hearings, Congressional studies, and through the GAO. For example, the current DCMO, Hon. Elizabeth McGrath, testified before Congress on five different occasions in her first 13 months after being appointed in July 2010 (U.S. Government Printing Office 2011). It seems, therefore, that the role of the Principle in our Principle-Agent dynamic is not just the President, but the Congress as well. As we saw in the earlier discussion on performance measurement, Congressional monitoring and the regular annualized expectations for reporting progress establish a bias toward behavior-based measurement, which, according to Eisenhardt, undermines outcome-based contracts. Appointees must therefore strike a balance that involves compromising on implementation of policies between administration agendas and Congressional interests, and the result is often sub-optimal execution.

This is not to say that appointees can be categorically described as "careerists" purely from the perspective of wanted to further their own livelihood. Rather, it is likely that the focus on near term results is at least partially motivated by the view that if they can maintain the confidence and support of those with the power to remove them, they can remain in office longer to achieve longer-term objectives. The shortcoming of this perspective is that there will always be near-term needs for results that will supersede long-term goals.

6.3.4 Organizational Incentives

Organizational incentives are distinguished from individual incentives in that they are institutionally rooted and can be considered part of the organization's culture. Leaders of those organizations identify with that culture and adopt positions that advance the organization's interests across a broad range of policy areas, particularly if those leaders have come up through the institution's ranks. Often, it is the lack of an incentive that precludes a course of action that might otherwise lead to an overall net benefit to the Department. In the case of defense business systems, the lack of incentives to reduce duplication of investment between the Services is a significant factor in wasteful spending.

Allison and Halperin, as referenced through Flynn (2011), observed this phenomenon nearly four decades ago:

> *Members of an organization, particularly career officials, come to believe that the health of their organization is vital to the national interest. The health of their organization, in turn, is seen to depend on maintaining influence, fulfilling its mission, and securing the necessary capabilities. The latter two interests lead to concern for maintaining autonomy and organizational morale, protecting the organization's essence, maintaining or expanding roles and missions, and maintaining or increasing budgets. (Allison and Halperin 1972)*

Within the Services, the Secretaries and Service Chiefs have a responsibility to establish and maintain the conditions that make it possible for their Service to successfully prosecute the missions viewed as legitimate and important by that Service while maintaining the fiscal and psychological health of the organization. They do not have the responsibility to ensure the Department of Defense as a whole operates effectively and efficiently.

Note that these characteristics are as viewed by the Service. There are ample examples of each Department vying for a greater role in the joint mission, such as Gen. Tommy Franks (ret.) reflecting on his planning session in preparation for Desert Storm, again referenced in Flynn (2011).

> *I had spent thirty-five years trying to work around the problem of service parochialism; now, as a CINC [Commander in Chief], I saw how that kind of narrow thinking had affected even the highest levels of military planning. As I worked out force requirements for CENTCOM [Central Command], it became obvious that each of the services was focused on winning wars—alone [sic]. They were funded as independent entities, and had no real inclination to fight together [sic] as part of a joint team.*

This gets to the kernel of the problem with organizational incentives and their effect on defense capability planning. Broad, strategic imperatives for improving business systems investment developed at the top level are flowed down to the Services, but the Services interpret the guidance in ways that seek to minimize disruption to their own interests. According to an external GAO observer who has been working for years with the DoD documenting its IT investment practices,

> *"OSD has good intentions...they provide guidance out to the MILDEPs to do things a certain way, but then you have the Military Departments where they really want to do things their own way, rather than have one consistent approach across the Department of Defense."*

There are no incentives for the Services to support the greater common good when it means sacrificing on their own interests. When it comes to defense business systems, this manifests as reluctance to adopt someone else's systems in support of business processes that should be fairly common across the Army, Air Force, Navy, and Marines. From their point of view, though, this can be seen as good risk management: control that which you depend on.

In commercial firms, senior leadership will often incentivize commonality and standardization by allowing the business units to use part of any resulting cost savings toward furthering their respective goals. To mitigate freeloading by business units leveraging another's investment, firms often employ chargeback mechanisms in which the beneficiaries

of the investment pay a prorated service charge. In contrast to overhead tax mechanisms that distribute cost sharing regardless of system use, this approach encourages cooperation between the investing and using units in defining the shared architecture and its capabilities. Because the using units don't have to invest their own development dollars up front to create a downstream capability, they can use those funds for other needs. Furthermore, the chargeback methods provide a way to measure the value of the business system to its principle users.

In the DoD and the Services, there are savings reinvestment mechanism available, but programs are hesitant to give away dollars because of the significant uncertainty of getting them back downstream when needed. Every investment dollar is tied to a specific program element within a strictly controlled and monitored spend plan. If savings are realized, those dollars must be reprogrammed by the Service or, above certain thresholds, through OSD. Programs that identify excess funding due to cost savings are virtually guaranteed to lose those dollars, although each Service has its own policy of quid pro quo to allow in some cases for limited replacement of funds voluntarily "donated" in one year or in one appropriation for funding in another. The uncertainty of that exchange and the ramifications of reducing the reserve pool in the face of potential unanticipated problems motivate programs to find ways to spend what they have.

Additionally, the perception that the defense budget calculus is a net zero sum game has a strong influence over the politics of resource allocation. Services vie to maintain or increase their share of the budget through a proxy war of mission relevance. If total obligation authority is fixed, then increasing one Service's budget to accommodate a new or shifting mission must surely come at the expense of one or more of the other Services. Service leaders don't want their institution to be on the "expense" side of that equation. Flynn (2011, pp. 9-10) describes the post-Cold War environment of influence competition in terms of Service views of missions and capabilities: The Marines advocated scaling back the Army in favor of a more agile, urban (and ostensibly Marine-led) capability and advocated a reduced Air Force mission focused on space and cyber, while the Army argued that the lightweight V-22 Osprey favored by Marines was insufficient to deploy the necessary equipment to support an engagement.

In the governance framework, incentives play a role in the alignment of workforce to the goals of the organization and in the alignment of the organizations to the goals of the enterprise. When the incentives are carefully structured to support those objectives and goals, the incentives reinforce positive alignment. When the incentives are misaligned to the strategic objectives, they reinforce behaviors that undermine goal achievement. Principle-agent, behavioral theory, bounded rationality, and bureaucratic politics all provide different insights that help understand what is observed in practice in defense business system investment planning and management, and may provide clues about how to better incentivize enterprise alignment toward improving investment practices.

CHAPTER 7. CURRENT STATE IN PRACTICE: COMMUNICATION METHODS

7.1 KNOWLEDGE INTEGRATION AS AN IMPLICIT GOVERNANCE FUNCTION

When members of an enterprise convene within governance bodies, they perform two kinds of functions: explicit and implicit. The explicit purposes are the governance objectives which the forum is chartered to achieve. In the context of the IRB, its explicit purpose is to make decisions about system certifications and acquisition program viability based on an assessment by the various stakeholders of the supporting information. The outcomes of these decisions take the form of guidance and direction to the programs and recommendations to higher level authorities. As was shown earlier, the IRBs must overcome some significant challenges in meeting their explicit purposes. Yet these boards also serve an implicit function by facilitating organizational learning through the integration of knowledge across the enterprise.

Knowledge integration as defined by Grant (1996) is the accumulation of specialized knowledge from different members of the organization. Grant goes on to identify two flavors of specialized knowledge: explicit, or "knowing about", and tacit, or "knowing how". The former might also be characterized as "awareness of", such as the status of an acquisition program, and it can be conveyed simply by its communication. The latter might equate with "understanding of", a form of knowledge that requires a shared or like experience in its application in order to be transferred from one individual to another. Consider this familiar proverb: "Give a man a fish and you feed him for a day; teach a man to fish and you feed him for a lifetime." Explicit knowledge transfer is the rough equivalent of giving the man a fish. On the other hand, teaching that man to fish requires tacit knowledge transfer.

Governance bodies support knowledge integration and organizational learning in three fundamental ways. In *baselining* integration, the participants bring together new information from their respective parts of the enterprise in an explicit knowledge transfer that brings everyone to a common state of awareness of important facts and circumstances. During the *problem-solving* integration, the specialized knowledge and skills of the participants are brought to bear to interpret and digest the information, incorporating it into the decision-making process in order to identify remaining knowledge gaps or develop action plans. The experience of applying decision rules to specific cases creates first-order tacit knowledge. Additionally, reasoning through the thought process behind one's view on an issue helps others understand how the member arrived at that position. Over repeated instances, the participants gain an understanding of how each of the others approaches problem-solving and their philosophy about the governance process. This understanding of how the governance body operates and makes decisions represents a form of second-order accumulated tacit knowledge. Finally, *diffusion* integration occurs as participants digest the events of the board meetings, filter the information, and distribute it to varying degrees back in their respective parts of the enterprise. This last stage is primarily explicit, although in some cases the participant brings firsthand tacit knowledge of how the governance body's decisions are made into other governance processes.

Because the exchange of tacit knowledge is an experiential process, it is very difficult to transfer between governance bodies such as between the IRBs and the DBSMC. Because the members of the DBSMC do not participate themselves in the IRBs, they must rely on the diffusion of explicit knowledge through the Certification Authority's certification memorandum or in the form of IRB briefings and reports. This is necessarily an imperfect exchange because the information about how each IRB arrived at its recommendations is

Form of Knowledge Integration	Directionality	Type of Knowledge
Baselining	Participant to Governance Board	Explicit
Problem-Solving	Within the Governance Board	Tacit
Diffusion	Participant to Home Organization	Explicit (tacit)

Table 6 Knowledge integration in governance bodies.

distilled into the minimum set required to justify those recommendations. One strategy for coping with the limitations of filtered explicit knowledge transfer is to supplement the DBSMC membership with advisory members who are the IRB Chairs. This provides direct access to those with firsthand knowledge of the full set of issues and challenges considered by the IRB in arriving at the recommendation.

Similarly, an IRB member pointed out that although they get Assistant Secretary level participation from the Services, it would be particularly helpful to have the Service CMOs there.

> *"We're not being as effective as we could be in communicating our requirements [for business processes] to the CMOs, because they're just getting the results of what we're doing and not seeing the challenges throughout. If I was king for a day, I would include the CMOs as part of that process."*

In this case, the ability of the IRB to communicate its needs to the Services is inhibited by the fact that only superficial explicit knowledge of IRB outcomes is transferred to those that have the accountability for change management in those institutions. What the CMOs lack is the specialized, tacit knowledge of the path it took to get to those outcomes and the challenges along the way.

7.2 THE ROLE OF COMMUNICATION MECHANISMS IN INTEGRATING THE ENTERPRISE

One of the key objectives of investment governance is to reduce duplication of investment across the constituent organizational elements in the enterprise. The IRB is one of the few if not the only formal governance body that provides Services and Agencies the opportunity for an in-depth look at investment activities occurring in sister institutions. Since every qualifying business system must brief an IRB, and each IRB has representation from the Services and Agencies, it stands to reason that each institution can potentially see every other institution's programs. Note, however, that a great deal of the real value of this information would be to foster coordination at the program level where PMs and Chief Engineers can evaluate the approaches and technologies in use for other programs with

similar needs to capitalize on the shared investment. Unfortunately, PMs don't sit on IRBs and therefore lack visibility into other programs.

Consider the challenges of integrating the specialized knowledge required to evaluate and adapt architectural and acquisition strategy decisions across programs when the linking mechanisms are near the tops of the organizations involved. For example, in the Human Resources Management IRBs, the Service representatives come from the respective Offices of the Chief of Staff, far removed from the Program Office. How easily is this knowledge shared down to the programs? More importantly for an enterprise seeking to better integrate across the Services, how often do Program Managers hear about what those other Services' programs are doing? Figure 24 provides a simplified view of the challenge in this network.

The opportunities start with a Service representative sitting at the IRB. Many programs pass through the IRBs, and each provides a potential chance to leverage investments going on elsewhere. The chain can fall apart here for several reasons:

- Important details about a similar program are not absorbed by the representative because they're not known to be relevant to the program
- Important details about the program are not retained because there's no explicit action to follow up on
- The Service representative chooses not to attend that session because none of that Service's programs are briefing the IRB

Even if the connection is made and the details are communicated down, each subsequent knowledge transaction occurs through a new filter that may change or attenuate the information needed. Because of these constraints, Program Managers must rely on word of mouth and a bit of luck in order to identify opportunities to leverage technologies and investments in other programs. Breaking down cultural stovepipes will require better integration across the institutions at the working level where the knowledge exchange will have the biggest impact.

A more effective approach to knowledge integration across the enterprise would necessarily involve a greater degree of horizontal interaction. Indeed, Wright and Pandey

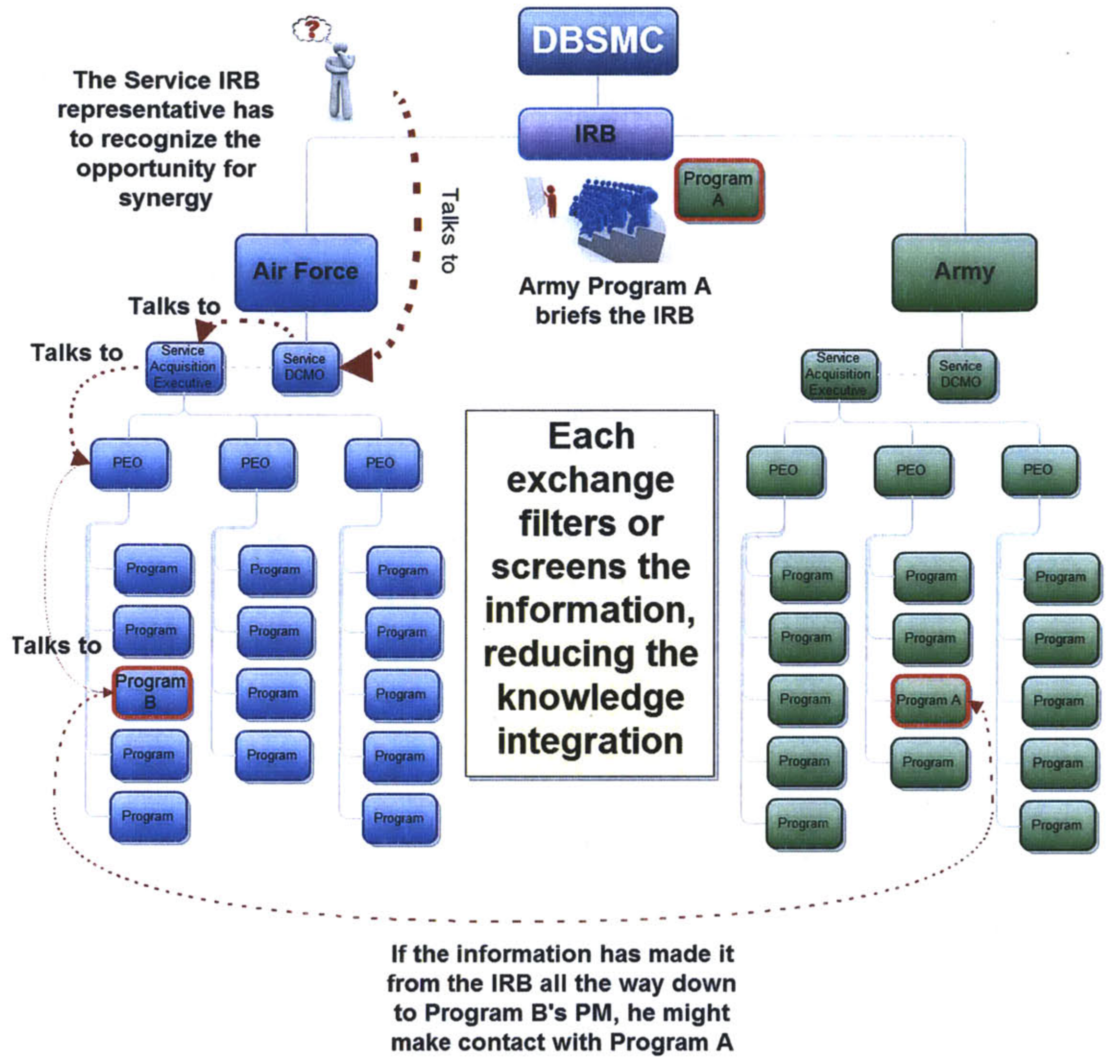


Figure 24 Fragility of knowledge integration when linking mechanisms occur at the highest levels.

identified strong correlation between lateral communication and successful transformation in a recent study of 205 public sector organizations (Wright and Pandey 2010). One of the principle challenges to this exists in the form of institutional boundaries that limit the flow of information between the Services. Because the stakes are so high, programs are reluctant to share information outside "the family" because of the uncertainty of where that information will end up, fearing that it might be used to the detriment of the program.

7.3 SPEAKING DIFFERENT LANGUAGES

The issue of nonstandard terminology arose in many of the interviews conducted with OSD and at the Service level. The ability to communicate is such an important facet of operating within an enterprise where knowledge is both the product and currency. Grant (1996, p. 116) underscores the importance of a common language:

> *"The existence of a common language is fundamental to integration mechanisms which rely upon verbal communication between individuals, namely, integration through rules and directives, and integration through group problem solving and decision making."*

Within the defense business enterprise, portfolio management, business process management, and performance measurement systems within the governance framework hinge on commonality in the terms of reference one uses to define them. One IRB member summed it up this way:

> *"Without a common language and standard reference points in the end-to-end processes, you can still run into problems defining the business processes and architecture. Without standards, you only have the policy documents, which are open to interpretation in implementation...and that also creates inconsistencies among the implementations."*

One example of this was highlighted in the context of the Human Resources Management core business area. In attempting to define a common end-to-end business process and data standards for Hire-to-Retire, OSD realized it had to overcome differences in the way the Army and Marines defined that lifecycle. Although both Services maintain a holistic view of hiring starting at the very earliest stages of recruitment, from a business process perspective, the Army separates recruitment from accessions. This has created challenges in standardizing the key process steps and data elements.

More fundamentally, several interviewees stated that different parts of the defense business enterprise have varying views of which systems need to be certified. As written, the law stipulates that only business systems modernizations over $1 million must be certified. What constitutes a modernization? Is any change to a system considered a modernization?

What if a program is only refreshing its data servers or renewing enterprise site licenses…is that a modernization?

A simplistic view would be to look strictly at the appropriation of money used to fund the change. Research, Development, Test and Evaluation (RDT&E) dollars are commonly associated with new capability efforts and would easily fall into the modernization category. Operations and Support (O&S, also called Operations and Maintenance or O&M) dollars are used to use and sustain systems and are the kinds of resources allocated to the operational commands. However, these funds are sometimes used in the field to fill urgent capability gaps that can't be satisfied by traditional acquisition processes in the timeline required. Are those field upgrades considered modernizations? Similarly, Procurement dollars are used to fund technology refresh efforts in information systems. Some would argue that refreshing is a strategy to mitigate obsolescence and therefore wouldn't constitute modernization. Others would argue that the intent of the law is to improve oversight on the vast resources spent on IT improvements, and if that means tracking data center updates, then those programs should be held to the certification requirements too. In fact, these cases occasionally do occur as identified by one IRB chair:

> *"Sometimes, programs that are mostly sustainment efforts can broach the threshold for modernization and therefore get to brief the IRB"*

Legislative efforts to remove the "modernization" term from the rules will mitigate this particular issue so long as the language includes explicit definitions of what constitutes a covered system. The burden will then shift to clarifying distinctions between business systems that require certification and National Security Systems[12] that don't.

[12] National Security Systems are defined in Section 5142 of the Clinger Cohen Act as "any telecommunications or information system operated by the United States Government, the function, operation, or use of which (1) involves intelligence activities; (2) involves cryptologic activities related to national security; (3) involves command and control of military forces; (4) involves equipment that is an integral part of a weapon or weapons system; or (5) subject to subsection (b), is critical to the direct fulfillment of military or intelligence missions." Subsection (b) limits this definition to exclude systems that are to be "used for routine administrative and business applications (including payroll, finance, logistics, and personnel management applications)." (1996). Information Technology Management Reform Act of 1996. 40 U.S.C. 1401. United States, National Archives.

7.4 FORWARD PROGRESS: SUCCESS STORIES AND INITIATIVES

One of the success stories identified by a number of OSD interviewees was progress by the HRM IRB in standardizing the language of its business area. The HRM IRB has made great strides in its Common Human Resources Information Standards (CHRIS) initiative, defining common standards for processes and data within its integrated personnel pay portfolio. OSD and the Services had learned from the failure of the Defense Integrated Military Human Resources System (DIMHRS)[13] acquisition that one of the contributing factors was the tremendous complexity added in trying to map across different systems with different data definitions and terminology:

> *"We recognized that in order to develop a single, integrated personnel and pay system, had to have standards defined to an excruciating level of detail in place and enforced."*

With support and advocacy from the DCMO, the HRM business area has launched version 2.0 of its Joint Enterprise Baseline which integrates and reconciles the human resources and finance and accounting aspects of personnel pay (OUSD (P&R) Information Management 2011b).

[13] DIMHRS was a ten-year effort to bring all the Services under a single integrated pay system. After spending nearly $1 billion without delivery of a capability, Secretary Gates directed USD (AT&L) Ashton Carter to cancel the troubled program in February 2010.

CHAPTER 8. CASE STUDY: COMMERCIAL PHARMACEUTICAL

8.1 Centralizing Investment Decisions in a Decentralized Enterprise

Commercial firms choose to centralize IT investment decision-making and standardize business processes for a variety of reasons, although it's important to recall that the two do not always go hand-in-hand. Virtually all organizations exhibit some degree of centralization, in the form of senior leadership or boards of directors. With respect to decisions about how IT investments are made, however, the full spectrum of governance can be found in both the private and public sector, reflecting both the conscious and unacknowledged priorities of the enterprise. Centralizing investment decision-making is an aspect of the governance framework as discussed previously and it provides a way to ensure that resource allocations are made with an enterprise perspective. Centralized frameworks often use hierarchical review processes that allow for pushing less critical decisions down in the organization and act as a filter to weed out issues that don't truly require senior management attention. Ideally, these hierarchical decision mechanisms also introduce an incrementally broader organizational perspective at each stage so that decisions made at the top have incorporated the views and impacts of the various elements of the enterprise. On the other hand, such hierarchies are often labeled rather unfavorably as "bureaucratic" and cumbersome. For those reasons, enterprises focused on agility and local responsiveness in their business units or operating divisions will often employ decentralized schemes for decisions about the IT investments that support their individual needs.

Likewise, the choice to standardize business processes and technologies is driven by strategic goals. The most obvious and common justification for standardization is to reduce the cost of doing business. Operational efficiencies are expected to result when variability in common processes can be reduced or eliminated. Firms also choose this path in order to improve the quality and consistency of their products and services, emphasize safety and security, or to present a common look and feel for the customer experience. When a firm

attempts to standardize enterprise-wide technologies and business processes under a decentralized IT funding model, priorities will collide. When push comes to shove, the business unit's strategic performance imperatives will drive it to optimize its investment decisions to support its own goals rather than to sacrifice for the "common good" which it has less incentive to support. Such was the case for a major pharmaceutical company looking to drive more value from its IT investments. In order to preserve anonymity for this commercial case, the company will be referred to as XYZ Pharma.

8.2 BACKGROUND

8.2.1 Reorganization and Acquisition

In 2011, XYZ Pharma was in a state of transition. Over the last several years it had been shifting its organizational model to from a geographically-oriented structure to realign along vertical business units focused broadly on product development and manufacturing, business operations and finance, human resources, enterprise resource planning support, and information technology. As part of the reorganization, XYZ aligned it's IT support to the business units and created a Shared Services group from three enterprise-level IT units to champion and manage enterprise wide initiatives. In the midst of this tremendous undertaking, the company completed the acquisition of another large company that required substantial integration during the still-evolving reorganization.

8.2.2 Strategic Challenges

XYZ Pharma had always been decentralized in its approach to IT investments: the business units made their own decisions about how to spend their IT dollars, but corporate leadership recognized the need to standardize common processes across the enterprise to capitalize on business efficiencies. At the same time, competitive pressures and expiring patents were pushing pharmaceutical companies across the industry to establish future revenue streams in the form of new products. As in many other pharmaceuticals, the product lines were given wide latitude in discretionary IT spending to reduce any impediments to business growth.

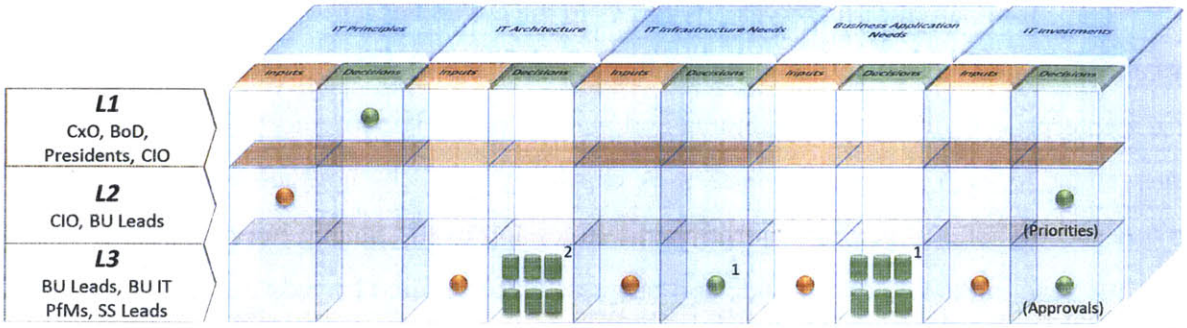
The combination of these various forces in the context of a major enterprise reorganization and a large corporate acquisition created significant strategic challenges for XYZ's enterprise IT investment planning and management. The foremost of these were issues related to its IT governance processes, capability and technology lifecycle planning, and low success rates at getting enterprise initiatives approved. Shared Services was constantly reacting to enterprise-wide and business unit-specific IT needs instead of proactively planning for them, and they were falling short in meeting both despite heroic efforts. The Enterprise Architecting team within Shared Services summarized their intent:

> *To compare and contrast models of how to more proactively manage IT core capability and technology lifecycles and migration budgets across multiple business units, supported by both business unit and central IT organizations, while remaining agile to each business unit's needs or constraints and managing the diversity and interdependence of technologies and solutions.*

Many across the organization realized the current model wasn't working, but they lacked consensus on the underlying causes and how to address them.

8.2.3 XYZ's High-Level Investment Governance Structure

XYZ Pharma uses a three-tier governance structure for decisions about IT priorities and investments as shown in Figure 25 below. Broad IT Strategies are set by the Level 1 executive leadership consisting of the Presidents, key Chief Executives, the Board of Directors, and the CIO. As part of this strategy, Level 1 (L1) governance establishes capital expenditure (CAPEX) and operating expenditure (OPEX) budget levels that set the overall caps on spending for IT capabilities and services. Level 2 (L2) enterprise leadership aligns the overall IT strategy to the business strategy and establishes architecture and investment priorities across the business units. The CIO chairs the L2 governance in addition to participating in L1 governance in order to provide continuity, and the CIO's counterpart business leads from each of the business units also sit on the L2 governance. In the Level 3 (L3) governance, each business unit conducts its own decision support processes involving both business leads and their dedicated business unit IT leads and participates in cross-business unit governance with Shared Services IT leads for enterprise-wide initiatives. Portfolio governance occurs at this level and includes mechanisms for sponsorship, review,



1. Infrastructure needs are advocated by Shared Services while Business Application needs are developed by the individual business units; both compete for sponsorship support and resources within the business units
2. Architecture decisions are owned by the business units except when those decisions have an enterprise wide impact

Figure 25 XYZ Pharma IT Governance structure.

and approval of investment projects. Specific needs for business applications are driven by the individual business units, while supporting infrastructure requirements are advocated by the Shared Services teams within the portfolio governance. Architecture decisions also occur primarily at this level with oversight and guiding priorities from L2 governance.

8.2.4 Investment Selection at XYZ

Each business unit owns its IT resources and the decisions for investments using those resources. When project ideas are conceived, the activity is scoped in partnership between the business unit or Shared Services IT project manager and the business side counterpart. The project then goes into an endorsement workflow that first identifies whether the project is already part of an existing resource-constrained portfolio roadmap. If not, the project resource requirements must be counterbalanced within the portfolio unless the business units can make the case to L2 governance that the trade-offs can be taken elsewhere in the enterprise. Most projects are required to develop business cases that demonstrate their value in the form of the return on investment (ROI) or internal rate of return (IRR)[14].

One of the business case issues identified in interviews with various internal stakeholders was that the business cases do not typically include all costs associated with

[14] ROI measures the net financial benefit of the investment as compared with the cost of implementation. IRR is a metric that evaluates what the benefit yield of the project must be over the life of the investment in order to break even relative to the lifecycle costs; decision-makers look for an IRR that exceeds the cost of capital or the return rates of other investments of similar risk

bring the project to fruition. For example, infrastructure impacts associated with a new application or mobile technology are often underrepresented or neglected entirely, leading to unrealistic ROI calculations. Internal labor is viewed as "sunk cost" and is also left out of the business case. This makes it more difficult to compare the true costs of projects with different requirements for integration support.

Under XYZ's funding model, there is no central budget to fund enterprise-wide efforts that have cross-cutting impact. As a result, enterprise initiatives must compete with business application needs for sponsorship within the individual business units. Not surprisingly, projects that directly support business unit needs fare much better than enterprise efforts. Compounding this challenge, infrastructure investments are notoriously hard to articulate business value for due to higher up-front costs, extended implementation times, and longer term payoffs. In some commercial firms, this problem is side-stepped through segmentation of IT budgets with explicit infrastructure portfolios and funding. At XYZ, Shared Services faced an uphill battle building compelling business cases to garner business unit support.

Once the project has been endorsed by the business unit, it proceeds to financial approval and functional review. If the project is low-cost, it may be authorized to begin immediately. Initiatives exceeding a $1 million threshold and other special interest projects go before the L3 IT Review Board for approval. The IT Review Board membership includes key IT enterprise representatives from the business units, Shared Services, quality and compliance, finance, and several other functional offices. Approved projects are given baseline spending authority and transition into a design, build, test, and deploy phase where they are monitored for performance against the baseline.

8.3 CASE METHODOLOGY

8.3.1 Overview and Scope Definition

The XYZ Pharma case was developed based on a three month enterprise analysis and transformation study conducted in early 2011. The study team worked directly with an XYZ sponsor from the Enterprise Architecture team within Shared Services whose participation

was integral to the analysis process and instrumental in establishing the stakeholder buy-in and interview linkages. The principle objectives of the project were focused on the key challenges identified earlier: technology and capability lifecycle planning, business value proposition and funding models for enterprise initiatives, and governance practices. The problem statement elements are shown in Figure 26.

8.3.2 Current State Perspectives

After defining the scope of the study, the team worked with the sponsor to gather relevant governance documentation in areas such as portfolio management, application sourcing, architecture development, quality compliance, security, common technology standards, and infrastructure sourcing. Additional documentation and conversations with the sponsor provided insight into the strategic objectives for the IT enterprise and the performance measurement framework in use at XYZ.

Early in the process, the sponsor identified over 20 stakeholders from across the IT enterprise both within Shared Services and in the business units for interviews. The interviews were focused to gain a better understanding of stakeholder perspectives of organizational strategic and operational priorities, business practices, value exchange, performance measurement, issues and challenges, and initiatives used to overcome the challenges. The specific questions used are listed in Appendix C. As each interview was conducted, the sponsor and the study team recorded the interview and transcribed the notes, which were then provided to the interviewee for validation. Once the interviews were completed, the team analyzed the responses to identify patterns that would indicate systemic

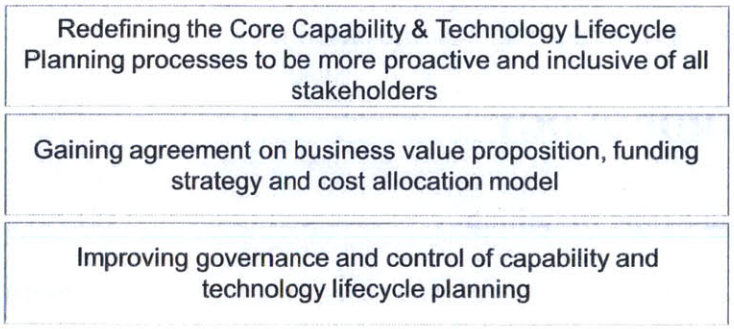


Figure 26 XYZ Pharma case problem statement.

issues or significant differences of opinion from different parts of the organization. After completing the current state analysis, it was presented in draft form to groups of stakeholders from the business units and from Shared Services to give them an opportunity to view and comment on the findings in context. In this way the team mitigated the potential for any unintended bias in the capture of the responses or in their interpretation.

8.4 FINDINGS AND ANALYSIS

8.4.1 Expectations – Delivery Gap

Questions about stakeholder value expectations and enterprise delivery on those expectations are helpful for several reasons. First, they give the stakeholder an opportunity to identify what is most important to them in terms of the value they should receive for their contributions and their assessment of how well the enterprise is actually performing. This usually reveals some misalignments between the enterprise objectives and those stakeholder values: objectives are often developed based on the objective-setter's assumptions about what the customers, employees, or other stakeholders want rather than getting the ground truth from the source. Additionally, the stakeholders' perceptions of the enterprise performance can differ from those of the enterprise itself, which indicates inadequate feedback mechanisms to those that can affect enterprise policies and their implementation. Taken in aggregate across multiple stakeholders, the value assessments can also reveal patterns of frustration. This helps leadership prioritize issues in order to more effectively focus limited time and attention.

Recall in this case study that the portion of the enterprise of interest was the Shared Services group and the stakeholders were employees within the three Shared Services Divisions as well as their "customers" represented by IT leads in the business units. The resulting pool of interviewees sampled from multiple levels across six different divisions representing diverse opinions from portfolio managers, enterprise architects, infrastructure and application integration specialists, business unit application developers, quality and compliance, information security, and engagement partners, among others. The values identified most commonly across the stakeholder interviews were Accountability, Unity within the Shared Services group, the impact of the Funding Model on enterprise initiatives,

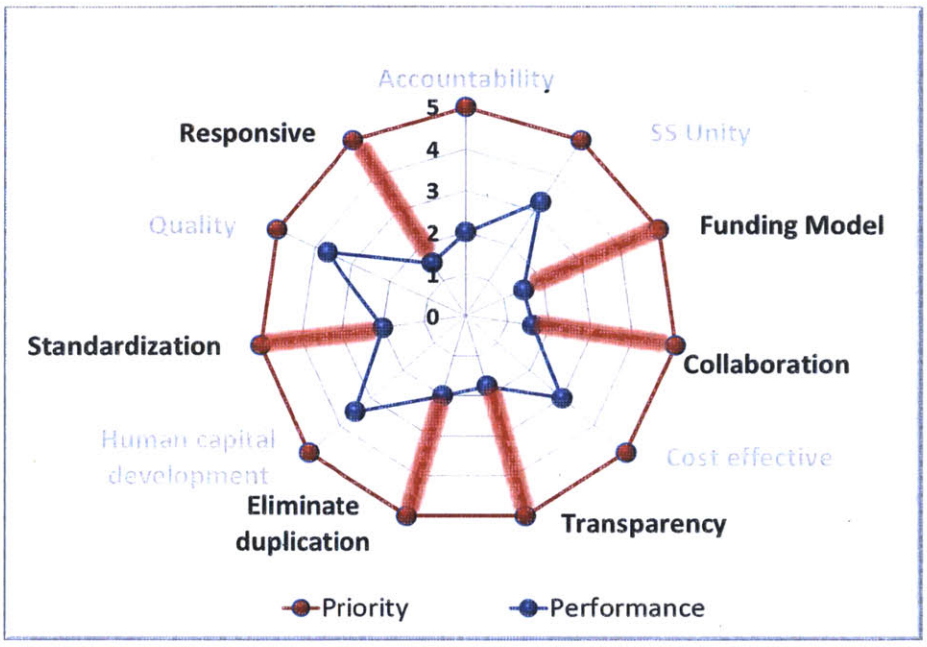


Figure 27 Most commonly identified stakeholder values with the averaged ratings for importance (red points) and Shared Services performance (blue points). Disconnects highlighted by bright red lines were cited by the stakeholders as indicative of key frustrations.

Collaboration across the entire IT enterprise, Need for Cost Effective offerings from the Shared Services group, Transparency of investment decision-making, Minimizing Duplication of Effort, Human Capital Development, Process and Technology Standardization, Quality of Services and Offerings, and a Shared Services group that is Responsive to the business unit needs. Among these, roughly half of the issues were emphasized for the disconnect between expectation and delivery as shown in Figure 27. These are described below.

8.4.1.1 Funding Model

Stakeholders within the Shared Services group consistently identified the importance of having a funding model that supported enterprise-wide initiatives. Existing funding policies put the budgets in the business units with no centrally funded accounts for common needs.

8.4.1.2 Collaboration

This value stressed the importance of Shared Services and business units working together to build strategy, technology roadmaps, and project planning, rather than the predominant model of building these "in private", then bringing in other stakeholders later in the process when it becomes more difficult to impact the decisions.

8.4.1.3 Transparency

A number of interviewees within Shared Services remarked that it was important to them to understand how decisions are made at leadership levels and what those decisions are after they're made. This was particularly true of investment decisions about enterprise level projects that historically fared much worse than line-specific initiatives.

8.4.1.4 Minimize Duplication of Effort

Within Shared Services, the culture of a single group working as an aligned partner to the business units was still maturing. The absence of clear direction on how roles and responsibilities were allocated across the three divisions within Shared Services left some stakeholders to identify the importance of working to reduce duplication of effort across the group.

8.4.1.5 Standardization

With a culture that focused on business unit growth and independent decision-making to foster market agility, XYZ Pharma had developed numerous different ways to do the same tasks within each business unit. Furthermore, each business unit had the authority to spend their IT budgets in whatever manner they felt would advance their business goals. Across the enterprise, this meant different technical baselines, duplicate software licenses, and disparate business processes. Stakeholders from across the enterprise recognized the need for improved standardization, and it was a key strategic objective from leadership.

8.4.1.6 Responsiveness

Stakeholders within the business units value responsiveness to the business units' needs. The low performance assessment reflected the perception that service requests from the business units to the Shared Services group take too long to address and that Shared Services could do more to understand and anticipate their needs.

8.4.2 Key Challenges

The stakeholders were given the opportunity to identify what they considered to be major challenges organizationally or within the areas of governance, capability and technology planning, and business case development. The issues described below result from an analysis of the feedback and synthesis of central themes based on the interviews and other current state information such as enterprise process documentation.

8.4.2.1 Organizational

Unity of Purpose. One of the fundamental issues faced by Shared Services was a recognition of the opportunity to improve unity of purpose and communication within the group. The culture of "one Shared Services" was still being developed, and it was more common for internal stakeholders to identify with their individual divisions than with a Shared Services structure. Some interviews indicated a lack of awareness that there was a formal designation of Shared Services, and there was a sense that a unified Shared Services vision and goals were needed from which the individual division strategies and objectives would flow.

Confusion in Roles and Responsibilities. Within Shared Services, there was some confusion about how the various teams work together and how hand-offs occurred between them. In some circumstances, the responsibilities between two teams overlapped and it wasn't clear who led and who followed. According to one interviewee, the last reorganization and major company acquisition contributed heavily to this confusion.

IT Professional Development. XYZ Pharma truly believed in the value if its people, but there was no formal development program to ensure its IT professionals maintained proficiency or gained necessary skills specific to their jobs.

8.4.2.2 Governance

Process and Technology Standardization. XYZ Pharma's governance and business processes had evolved under a business-unit focused culture into a series of independent decision structures. These structures showed some degree of success in achieving business unit goals, but enterprise wide decision-making suffered. Further, the separate business units had established their own preferences for different technology baselines, which meant more systems to support with that support tailored to each baseline. Additionally, there were few metrics to track the use of common services and components and no way to incentivize standardization. Those metrics that were collected became pro forma and generally didn't drive decisions.

Don't Know How to Say "No" to the Client. A number of Shared Services interviewees expressed frustration that the high pressure to support the business units led to a tendency to overpromise and under-deliver. In some cases, this was a result of mandates directed down to Shared Services to fit unplanned and unfunded requirements into their fixed budget. Similarly, business units were granted exceptions to standards compliance with no clear or documented processes for considering the impacts of those exceptions or establishing sunsets for expiration of the exceptions.

8.4.2.3 Business Cases

No holistic, standardized business case process. Because the decision processes were strongly aligned to the business units, each unit had developed its own rules for creating business cases. Although those rules were documented within the business units, there was limited visibility to those outside. Enterprise-level initiatives that had to go through those business units for sponsorship were developed without the benefit of knowing the rules, and the rules were different for each business unit. Business cases from the units, on the other hand, often didn't reflect all the lifecycle cost impacts, including lifetime support, technology

refresh, or internal labor costs, and they didn't always consider interdependencies among programs and infrastructure impacts. The result of these two factors was that enterprise initiatives usually fared much more poorly in comparison with the business unit's own projects in its own decision processes.

Lack of decision transparency. Along similar lines, stakeholders interviewed identified a lack of decision transparency when decisions were made at higher levels. It wasn't clear how decisions were made in the higher level governance, what the expectations were for a compelling business case, or what the approval criteria were for those investment decisions. Other questions such as "how do affected stakeholders get an opportunity to provide input to the decision?" had no clear answer. In short, these decision mechanisms were something of a black hole. That sense was amplified by the lack of feedback down to the enterprise when decisions were made. The outcome would eventually be known, but perhaps not the rationale.

Enterprise-wide initiatives disadvantaged in decentralized funding model. As mentioned previously, XYZ Pharma's IT funding model was decentralized. This business value focus for IT investments was a positive move forward for the company, as was embedding IT support within the business units. However, with no central source of dollars to support enterprise-wide initiatives, Shared Services had to gain the backing and financial commitments of each of the affected business units to resource their initiatives. Every initiative under consideration within the business units had to compete on the basis of economic analysis with Return on Investment calculations required for each proposed investment. Typically, these calculations would use discounted cash flows to determine a net present value for the project[15]. As many firms have discovered, enterprise-wide initiatives such as infrastructure modernizations cost more up front but have a bigger payoff in the out years. Therefore, projects with higher near term payoff, such as a business unit's application requirement, would be prioritized over those with larger benefits that accrued later. Since the

[15] Net Present Value economic analyses involve comparing investments on the basis of the net cash flows over the life of the projects. In recognition of the time value of money, these cash flows are discounted at a rate that represents the rate of return that the firm reasonably believes it could generate through other investments of comparable risk. The effect of compounding the discount over multiple years places greater emphasis on near term cash flows. As a result, projects with low up-front costs that realize their benefits in the near term compare favorably with those that have large initial costs and long-term benefits.

enterprise-wide initiatives provide broad-based benefits, the impact for an individual business unit might be low relative to other projects.

8.4.2.4 Technology Planning

SS versus Line View. In comparing the views of Shared Services interviewees with those of their business unit counterparts, it became clear that each was making assumptions about the other's preference for engagement on issues of technology planning. From the point of view of the Shared Services stakeholders, they felt the business units weren't including them in technology roadmap and business case development early enough, and Shared Services was left to catch up without the opportunity to provide substantive input to affect the direction. Ironically, the view from the business units was that Shared Services needed to be more proactive in working with the units as a partner to recommend strategies and roadmaps. They seemed frustrated that Shared Services acted more like order-takers than the equal partners in the process.

Globalization of Standards doesn't account for local needs. In a global environment, decisions to standardize technologies can have unintended consequences. In the case of XYZ Pharma, decisions about technology standards made I the U.S.-based Shared Services divisions tended to have a distinctly U.S. focus. Those standards don't always translate well in other countries, and for business units that may have dozens of countries' regulations to comply with, this can present a formidable challenge for implementation. The stakeholders that identified this issue pointed to the need for improved dialog to account for the international impacts of standards decisions. What may seem good on paper can generate institutional resistance or unanticipated or unbudgeted cost impacts that undermine the value of the initiative.

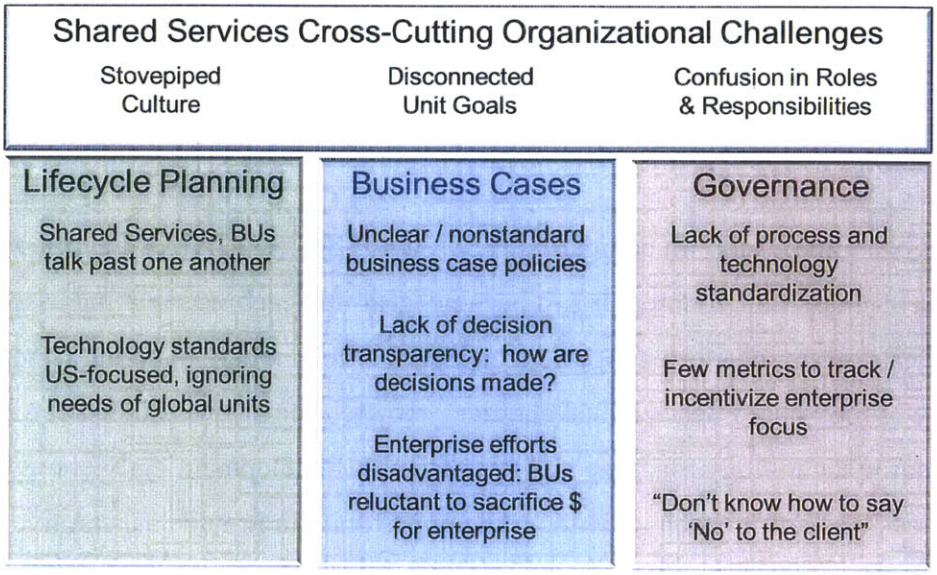


Figure 28 Summary of recurring issues from stakeholder interviews.

8.4.3 Success Stories

To XYZ's great credit, they had recognized the potential advantages of aligning the various business and governance processes to reduce costly variability where it wasn't warranted. The rallying cry for this effort was the One Team, One Process initiative. Over the first 12 months of the program, the enterprise had reviewed, streamlined, and rationalized over 900 different IT-related processes by nearly 40%. The benefits of fewer processes executed more consistently include lower overall execution costs, more predictability for planning, and more input into improving a smaller set of processes.

Another avenue for improving the cost effectiveness of the IT services has been judicious use of outsourcing for application development and routine maintenance. One stakeholder identified significant cost savings through the use of third party support contracts, noting also that it was often easier to enforce quality of service requirements through a contractual relationship than with another internal division.

Finally, numerous interviewees noted that the move to empowering individuals to help solve their own IT challenges through a self-service Help Desk was beneficial to both the IT enterprise and the XYZ Pharma workforce. Clearly, the project reduced IT support resource requirements. For the workforce, it also provided a way to incrementally improve

the IT savvy of the users, and they usually got answers to routine questions faster than by submitting a trouble ticket.

These examples underscore the commitment XYZ Pharma has to driving greater value from its IT resources. The IT enterprise, through its own initiative, gained leadership support for a transformation journey to address the fundamental issues identified above. By anchoring their analysis with an explicit identification of what was important to its key stakeholders, Shared Services gained credibility and opened lines of communication so that each of those stakeholders becomes an owner of the future state and the strategies and plans to get them there.

8.5 COMPARISON OF DOD AND XYZ PHARMA

8.5.1 Striking Similarities

One of the interesting findings in the comparison of this commercial industry case study to the DoD was the striking similarity in the issues identified. One might at first blush believe that the DoD's unique public administration network consisting of largely independent member organizations and rigid statutorily prescribed responsibilities set the conditions for a different set of challenges than one might find in a profit seeking commercial firm. However, a side-by-side look at the stakeholder analyses in the two environments shows a great deal of overlap as shown in Figure 29.

It seems clear, then, that the problems that are manifest in defense business systems investment planning and management are not unique to the DoD environment. Yet as we saw in previous discussions from Chapter 5 through Chapter 7, the industry practices used to address many of these issues on the commercial side aren't always directly translatable to public enterprises like the Defense Department.

DoD

- Inadequate project reviews
- Circumventing Governance
- OSD doesn't say "No"
- Stovepipe system focus
- Lack of strategic linkages and enterprise metrics
- No incentives for enterprise approach
- Communication barriers inhibit knowledge sharing
- Unclear governance policies

XYZ Pharma

- Technology standards US-focused
- Lack of decision transparency
- Don't know how to say "No"
- Stovepiped culture
- Disconnected unit goals
- Few metrics to track / incentivize enterprise focus
- Business Units reluctant to sacrifice $ for enterprise efforts
- Shared Services, Business Units talk past each other
- Unclear / nonstandard business case policies
- Confusion in roles & responsibilities

Figure 29 Comparison of DoD and XYZ Pharma governance challenges.

8.5.2 Key Differences

It is important not to oversimplify the comparison above. There are key differences that distinguish the DoD from most other organizations. First, the sheer size and complexity of the enterprise is an obvious discriminator. The DoD employs a workforce of 2.1 million people distributed across three subsidiary Departments, seventeen agencies, ten field activities, eight staff organizations, and nine Combatant Commands, spending roughly $700

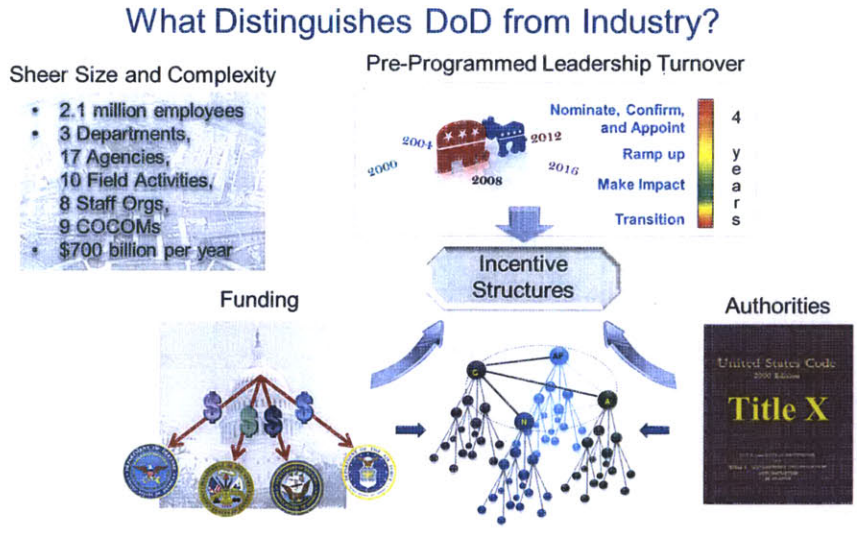


Figure 30 Factors that complicate the resolution of DoD's governance challenges.

billion per year. Second, the Department operates under a pre-programmed quadrennial leadership turnover cycle aligned to the presidential elections. Third, budget authority is distributed directly to the Services each year in the form of the Defense Appropriation and Defense Authorization Acts. Fourth, Title 10 of the U.S. Code prescribes the authorities granted to the Services to organize, train, and equip their forces to meet the missions delegated to each. The combination of the funding model and the statutory authorities creates a strongly independent network of organizations with a corporate layer of oversight applied through OSD to coordinate the diverse efforts of the network members. The DoD's challenges aren't unique, but the proven solutions from industry must be tailored to this complex environment. This reality is reflected in the recommendations provided in the next chapter.

CHAPTER 9. RECOMMENDATIONS

9.1 OVERVIEW

Practitioners of enterprise transformation will emphasize the importance of establishing a future state vision as a prerequisite for developing a transformation plan. Often, there seems to be a tendency to want to jump into solutions before fully analyzing the problem and establishing a future state vision. So-called "solution-oriented solutions" focus on the novelty of the solution in its ability to address the symptoms evident in the enterprise rather than staying in the problem-space to fully explore the scope and dimensions of the root cause.

While this thesis does not pretend to offer a transformation plan *per se*, it is just as important to avoid the temptation to jump in and suggest such point solution changes without considering the overall enterprise sight picture that describes the key characteristics desired in the preferred end state. This chapter identifies the broad desirable characteristics in a form that answers the general question, "How would we describe defense business systems investment planning and management at a future state in which we've addressed the key systemic issues?", then outlines the core governance changes that need to take place in support of those objectives.

9.2 DESIRABLE FUTURE STATE CHARACTERISTICS

Improving defense business systems investment requires addressing several foundational issues that bridge across the three core elements of governance, decision structures, alignment mechanisms, and communication methods. In the successful future state, the following fundamental characteristics describe the DBS investment enterprise:

- ***Explicit top level goals for business practice improvement are communicated down and aligned through the governing planning and policy documents in the DoD and Services***

- ***Feedback on strategic goal achievement is continual and accessible to the whole enterprise***
- ***DoD takes the initiative in its relationship with Congress on defense business investment improvement by proactively presenting feedback throughout the year on strategic goal achievement, challenges, and plans to overcome those challenges***
- ***The business language of the Department is standardized across OSD and the Services***
- ***Business processes replace individual systems as the point of focus for investment planning and management with supporting portfolio management aligned in support***
- ***The DoD institutionalizes transparent decision making and exception mechanisms to build governance clarity and promote trust across the enterprise***
- ***The Department fosters knowledge integration across the enterprise at all levels, creating opportunities and incentives to share challenges and solutions at the program level***
- ***Defense business systems leadership is stabilized and de-aligned to the election cycles to reduce influence of short-term political objectives on longer term strategic goal achievement***

Each of these statements is presented with supporting recommendations in the following section.

9.3 RECOMMENDATIONS ALIGNED TO FUTURE STATE CHARACTERISTICS

9.3.1 Strategic Goal Communication and Alignment

In Chapter 6, an analysis of the Strategic Management Plan revealed that despite the explicit identification of "Reforming How We Do Business" in the 2010 Quadrennial Defense Review, there was no single coherent strategic goal for improving defense business systems investment practices to anchor the Department's efforts to improving the business of its business. Individual objective elements were dispersed to support other SMP Business Goals, but this unintentionally dilutes the focus on foundational improvements.

In joint operations planning, unity of effort is of primary importance, achieved through clear communication of commander's intent and key objectives in planning documentation, Operation Plans (OPLANs), and related artifacts. These artifacts define the strategic context within which the supporting component commanders build strategies and develop options to contribute to the achievement of the broader goals. Given that most military operations exhibit a far greater degree of situational awareness throughout the command and control structure, this operational metaphor provides many lessons that would be beneficial to defense business investments.

The first step to achieving unity of effort across the Department of Defense is to explicitly establish a Business Goal for ***Business Operations Alignment*** in the upcoming 2013 SMP with SMP Objectives for each of the five core business mission areas to mature end-to-end processes, standardize process and data definitions across the enterprise, and align systems to the architecture within portfolios. Creating a point of focus in the SMP encodes this defense priority in a persistent artifact and allows it to be more clearly articulated to the enterprise. Capturing this Business Goal in the SMP also creates the vehicle for aligning the priorities of the Services in support.

Aligning Service priorities to the SMP requires improving traceability between the SMP Goals and Objectives and the individual Service strategic planning documents. Each Service should establish supporting strategic goals for business investment practice improvement that tie directly to the Business Operations Alignment goal in the SMP. This would ensure that the focus is applied consistently across the Services and would further facilitate measurement of progress in achieving the desired outcomes.

Another lesson learned from enterprise transformation practice is to maintain a long-term perspective on strategic objectives when reviewing them periodically. All too often, enterprise strategic objectives are reassessed periodically and the old objectives are tossed out with the bath water, making it difficult to correlate enterprise effort with achievement of longer term goals. Whenever goals and objectives are presented, they should be shown along with the prior year(s) goals to indicate where those goals have changed and the reason for that change. In the defense context, this would be enacted by showing the goals and

objectives from the previous SMP, identifying where those goals were achieved, overcome by events, revised, or discarded. This reinforces the message that the Department has a longer term plan and is adaptively executing within that more holistic picture. The annual Defense Business Operations reports to Congress should follow the same approach, giving Congress confidence that progress is being made against these substantial goals.

9.3.2 Enterprise Performance Measurement Feedback

With the strategic goal for Business Operations Alignment articulated and derivative priorities outlined within the Services, performance measures could be consolidated and flowed down. Bringing these measures together under a single Business Goal improves coherence, helps reduce the proliferation of metrics that don't drive decisions, and quickly reveals duplicative measures. The measurement plan should be clearly described, too, reflecting the way in which data is collected to support the assessment and the periodicity with which the metrics should be reported.

In addition, the entire enterprise should receive feedback on progress toward meeting defense business goals. This visible feedback practice reinforces positive performance, allows in-progress course correction, and generally improves situational awareness across the Department. Practitioners of lean production will find the analogous mechanism of visual control familiar (Murman 2002, pp. 103-104; Womack and Jones 2003, p. 56), where feedback tools such as *andon* boards keep the entire production floor aware of the overall flow of activity and areas requiring attention. The approach works on the theory that such cues keep flow status and impediments at the forefront of the mind using a commonly accessible signal.

In contrast, the current array of annual reports authored by the DoD for consumption by senior leadership and Congress are retrospective: they look back on the period of performance they cover and show where the Department demonstrated progress in the most positive light possible. What is needed is a Business Operations Alignment *andon* board: monthly or quarterly feedback on alignment objectives gives OSD and the Services the same "operational picture" of progress toward achieving the priorities so that those priorities stay in the forefront.

9.3.3 Take the Initiative with Congress

The DoD's relationship with Congress can be accurately described as reactive as shown in previous chapters. However, instituting the enterprise feedback mechanisms described above to demonstrate progress in achieving goals can be leveraged to take the initiative with Congress as well. Instead of adopting a defensive stance that reveals only the minimum information required, the DoD can drive the conversation by providing regular feedback on its progress against strategic goals.

Good news stories repeated on a regular basis become ingrained in the minds of those in the legislative branch, while proactive disclosure of problems and management's attention to fixing them demonstrates sound leadership. This regular feedback would also reduce the impact of GAO reports on terms more favorable to the DoD. As discussed in Section 9.3.1, this progress should be presented in the context of the long-term objectives in order to more clearly show where the Department is moving in the right direction.

9.3.4 Designate Process Owners and Portfolio Managers

Section 6.1.1 outlined the importance of establishing a clear business process focus for the Department. While this is already clearly recognized within the DoD based on numerous stakeholder interviews and in policy documentation, the emphasis for managing investments is still at the system level. The business processes should reflect the needs of the functional customers to accomplish the DoD's business operations, the business systems portfolios should align to the business processes, and the systems should be managed in the context of the portfolios.

One of the early priorities for the IRBs must be to designate accountable Process Owners for each of the primary processes under their purview. These Process Owners would be responsible for leading business process reengineering planning efforts in their area, coordinating change management across the affected components and system owners, and assessing the degree of performance improvement for the process. Working with subject matter experts in industry, OSD, and the Services, the Process Owners can identify areas to improve process effectiveness and efficiency based on technological advances. As principle

advisors to the IRB, they would help the board plan for and execute enterprise architecture efforts, bringing an end-to-end perspective.

Portfolio Managers must be designated as partners for each Process Owner. Where the Process Owner is accountable for the end-to-end performance of the business process, the Portfolio Manager ensures alignment of systems under the process. Each Portfolio Manager works with the various system owners to match capabilities to gaps, identify duplicate capabilities, and rationalize legacy systems that don't support the architecture. Like the Process Owners, the Portfolio Managers are principle advisors to the IRBs on matters of system alignment to the business processes and enterprise architecture.

Both the Process Owners and Portfolio Managers should be given special standing in the IRBs. Each system coming before the IRBs must be pre-approved by both the Portfolio Manager and the Process Owner who would attest to system alignment with the processes and architecture. Those systems that are not aligned would not meet the IRB and therefore lose the opportunity to petition for certification, although transparent exception processes should allow the granting of limited waivers in special cases. For aligned systems, the Process Owner would attest to how the system addresses documented gaps and helps meet OSD business goals, and as the accountable business process reengineering agent, must also attest to the completion of required reengineering efforts.

Section 6.1.1 highlighted the difficulties of portfolio management when similar or related systems meet the IRBs asynchronously. Without the ability to see these systems together in the context of the processes they support, it becomes difficult to compare how they address common capability gaps. One solution to this is to establish quarterly Business Process Portfolio Reviews (BPPRs) during which the Process Owners and Portfolio Managers would jointly brief the IRBs on their progress in refining the end-to-end processes and the architecture and presenting their recommendations for aligning systems to both while also identifying opportunities for rationalizing duplicative investments. The Process Owners would make business process and data definition standards recommendations in coordination with the Portfolio Managers, who would be responsible for advising the IRB on technology standards.

These reviews would take on a much more holistic view of the respective architectures and would provide a clearer overarching context within which to make recommendations to the DBSMC. Because of the strategic perspective that these quarterly reviews take, the Service CMOs or DCMOs should participate to understand and provide input into decisions that impact their respective architectures. This also allows the Services to take the initiative to sunset redundant systems of their own accord rather than awaiting direction from the IRBs or DBSMC.

Eventually, as the IRBs gain experience with Portfolio Management and the DoD demonstrates real improvements to Congress, the DoD could pilot a program within one core mission area that shifts from individual system certification to business portfolio certification. If successful the use of portfolio certifications would be extended to the remaining mission areas. The IRBs would then spend more of their time focused on end-to-end process and architecture outcomes and less on individual system certification reviews. The IRBs would still review each system for acquisition oversight, but that oversight would much more heavily leverage the inputs of the Process Owners and Portfolio Managers.

A critical supporting element in strengthening the IRBs through their Process Owners and Portfolio Managers is to set aside the idea of creating a Central IRB as proposed by DCMO and discussed in draft 2012 NDAA language. It is not clear whether that proposal was to replace or augment the existing IRBs. Given the throughput constraints that exist today, there is no conceivable way that adding another layer of management oversight to an overburdened governance structure will improve decision-making and shorten implementation timelines, particularly with the addition of sustainment programs to the list. If the idea is to replace the existing IRBs, then bringing all stakeholders to a single common board to address the full spectrum of programs requiring oversight and certification is sure to divert focus away from end-to-end core processes and architectures toward dealing with large, problem programs as individual systems.

9.3.5 Standardize the Business Language

The fact that variations in terminology and definitions appeared multiple times as an obstacle to effective practices (see 6.1.2 Stovepipes and Systems, 6.2.5 The Language Gap

and Its Effect on Performance Measurement, and 7.3 Speaking Different Languages) shows just how important and pervasive this problem is. Clearly, the enterprise needs a common lexicon for business processes, data, and metrics across its membership, but issuing proclamations to that effect are unlikely to achieve any meaningful results. Instead, OSD and the Services must work together from each end to develop the appropriate dictionaries to standardize the language.

In support of this goal, the Services should assign the role of Business Process Leads working in coordination with the IRB's corresponding Process Owners to individuals knowledgeable of the Service's own process implementations and terminology. These Service Process Leads would facilitate development of the common language and alignment of process and data standards where applicable. This standardization in terms of reference will allow for more meaningful measurement systems to be developed, requiring less manual effort to translate the data exchanged into actionable decision support information. The DoD has already embarked on process and technology standards, but until the constituent organizations are speaking the same language, millions of dollars will be lost to the fog and friction of business transformation war.

Finally, it is incumbent on OSD and the Services to clarify the relationship between the acquisition and certification governance authorities of the Undersecretary of Defense for Acquisition, Technology, and Logistics (USD(AT&L)), the Deputy Chief Management Officer (DCMO), and the Service Chief Management Officers. The overlap in authorities and duplicative governance requirements serve to confuse the rank and file acquisition community, particularly where Service and Corporate OSD oversight processes intersect. OSD must articulate

9.3.6 Enhance Transparency in Decisions and Exceptions

Trust is an essential ingredient in the relationship between those who participate in the governance and those who are subject to it. If the Services, system owners, and their respective customers don't trust the decision-making processes that determine whether their programs will move forward, they become reluctant to share information and look for ways to circumvent the governance. In today's weapon and business system acquisitions, the

Services and their customers must seriously weigh decisions to pursue formal acquisition efforts or to "modernize through sustainment" in the face of mistrust of OSD oversight and the high cost of complying with the myriad of acquisition constraints imposed through the Defense Acquisition System. One of the contributing factors to that mistrust is the sense that the decisions are made behind closed doors where the decision-makers are influenced through political maneuvering within the Pentagon and the system owners have no insight into the factors that lead to the outcomes. Improving the transparency of the decisions will go a long way toward restoring that trust.

The first step in this journey is to require the IRBs to publish minutes of each of their meetings and make those accessible across the enterprise. These minutes would provide insight into the issues of greatest priority to the IRB, the key discussion points leading to their decisions, and would serve to inform the enterprise on progress in maturing the architecture and business processes. Furthermore, each Acquisition Decision Memorandum issued by the Milestone Decision Authority for a system should discuss alignment to the business processes and architecture, degree of investment duplication across the enterprise, and individual program risk in supporting the decisions they document. Subject to classification restrictions, all ADMs should be accessible to all programs to allow not only the system owners but other programs to better learn from the collective experience.

Another governance mechanism used in successful commercial firms is a transparent exception process. Exceptions are a fact of life when strict adherence to enterprise standards might preclude the fielding of necessary capabilities. However, those exceptions must be documented with sunset provisions that require the system owner to bring the system into compliance within a certain timeframe or decommission it. The key is to document and publish those exceptions in order to make explicit the decisions to grant them. Additionally, the number of exceptions granted should be tracked as a metric in order to show progress toward standardization and to incentivize reduction in their occurrence.

9.3.7 Institutionalize Knowledge Sharing

Barriers to knowledge sharing are among the hardest cultural stovepipe problems to overcome. In many network enterprises, the linking communication mechanisms are most

apparent in the decision-making bodies as discussed in Section 7.2, where representatives from each member organization get together, exchange explicit knowledge, create tacit knowledge during the meetings, then return back to their organizations. When those member organizations are hierarchical in structure, the vertical knowledge transfer from the representative to those further down in the organization who might best benefit is tenuous at best for reasons described previously. Further, horizontal knowledge integration among network organizations is often discouraged, either explicitly by policy or implicitly due to the lack of organizationally sponsored or supported collaboration forums.

Within the DoD, knowledge shared and created in the IRBs is not effectively captured at the point where it could make substantial impact: the programs. Knowledge created within the programs is not effectively shared across the enterprise to other programs, either. Both vertical and horizontal knowledge integration must be improved if the DoD is to move more fully toward operating as an integrated enterprise and less as a confederation of stovepipes. So how will this happen?

To answer this question, recall the differences between explicit and tacit knowledge. Explicit knowledge is "knowing about" where the benefit derived is in the content of the information itself. Tacit knowledge is much more experiential in nature and is transferred when "knowing-how" is communicated. The benefit of tacit knowledge is that it can be used to create derivative value without dependence on the source of the knowledge.

Vertical knowledge integration in hierarchical organizations is almost by necessity an explicit knowledge transfer. Senior leaders who are Service representatives to the IRBs do not bring Program Managers to the meetings to teach them about how to participate in IRBs. Rather, the focus for knowledge integration from the IRBs down to the programs should be on information discovery. Situational awareness of other programs and their status, key points of contact in other organizations that can help solve existing problems, certification or acquisition decisions made and the reasons behind them, and progress in architecture and business process development are examples of information that could lead to other knowledge sharing opportunities. In the previous recommendation, IRB meeting minutes

were identified as an important way to improve decision transparency, but they would also serve to support information discovery.

Horizontal knowledge integration can take the form of explicit or tacit sharing. As mentioned above, explicit vertical information sharing creates cues that lead to other opportunities for horizontal cooperation. Contacts in other programs and organizations are established, explicit information is exchanged to determine whether there is utility in pursuing a more substantive relationship, and tacit knowledge sharing evolves if, as von Hippel (von Hippel 2002) describes, the need for innovative problem solving exists, there is incentive for both sides to disclose information about their programs, and the cost of exchanging that information in terms of effort relative to value is low for each party.

At present, the only existing enterprise-wide means for communicating explicit information about other systems is the Department of Defense IT Portfolio Repository (DITPR), a centralized database of IT program information. Programs are required to establish and maintain entries in DITPR when Baselining new programs and in preparing for acquisition milestone reviews. The tool has a search capability that allows users with accounts to search by program name or ID, by mission area, or by system status, but there are no keyword or tag search function to filter for applicable systems. However, as described in the executive summary to the User's Guide, the DITPR system is used primarily as a compliance tool for programs and a certification and status tool for senior leaders (AT&T Government Solutions Inc. 2011). OSD should extend DITPR or a derivative tool to provide a subscription-based functionality for PMs that want to be notified of new systems that meet certain criteria or of changes to existing systems of interest in order to greatly improve situational awareness of the business systems landscape at the Program Manager's level.

Moving beyond explicit horizontal integration requires more than web sites and news feeds, however. Interpersonal collaboration is essential to building the relationships that anchor tacit transfers. In the defense business enterprise, programs working directly together from different Services are in the best position to determine whether the technologies and strategies employed in one program are appropriate in a different context. An excellent example of collaboration at this level in defense information technology programs is the

Multi-Service Service Oriented Architecture (SOA) Consortium (MSC). The MSC is a coalition of Service command and control acquisition and technology programs working together to solve common complex problems in order to reduce duplication of effort and investment while sharing lessons learned that can be applied to multiple programs. Forums like the MSC specific to business systems should be sponsored by the Deputy Chief Management Officer to promote and foster working level collaboration across the enterprise.

Finally, institutional know-how can be cross-pollinated among the Services to help reduce barriers to collaboration through the use of rotational acquisition tours for both civilians and military personnel. Under this approach, program managers in each Service have an opportunity to serve in an acquisition assignment in another Service's program. The ideal point in the career for this rotation is at the military O-5[16] or government civilian GS-14[17] level where the member has already had some exposure to joint and sister service doctrine but is not yet identified for critical O-6[18] program management jobs.

Research by Dyer and Hatch (2004; 2006) demonstrates that Toyota gained significant advantages over competitors by establishing collaborative network relationships with suppliers and other strategic partners that included personnel transfers and supplier associations. A thoughtful approach is required in the DoD that pairs leadership emphasis, information technology and social media methods, and incentives in an Enterprise Communication Strategy to promote collaboration across OSD and the Services. This paradigm shift from knowledge protection to knowledge sharing must occur if the Department is to make sustainable progress in reducing duplication, breaking down cultural stovepipes, and leveraging specialized knowledge to common benefit across the enterprise.

9.3.8 Stabilize Defense Business Systems Leadership

This final recommendation deals with the issue of leadership tenure and the effects of political cycles on leadership focus. As presented in Sections 6.2.6 and 6.3.3, the Deputy Chief Management Officer (DCMO) is a politically appointed full-time position with a term

[16] O-5 military grades in the U.S. are more familiarly referred to as "Lieutenant Colonel" in the Air Force, Army, and Marines, and as "Commander" in the Navy

[17] Civilian GS-14 refers to the General Schedule 14 grade, roughly equivalent to a military O-5

[18] O-6 military grades are commonly referred to as "Colonel" in the Air Force, Army, and Marines, and as "Captain" in the Navy

of 4 years. Within the 4-year cycle, vacancies that exist at the start of a new administration are filled through a series of steps that begins with selection and vetting, nomination to the Senate, consideration and confirmation by the Senate, and appointment by the President.

According to the Presidential Transition Guide to Federal Human Resource Management, it is customary for incumbents to tender their resignation at the request of a new administration (OPM 2008). Additionally, most appointed positions serve at the pleasure of the President and may be asked to resign at any time. The political cycles, the lengthy process leading to appointment, and the potential for not being asked by the new administration to remain in position contribute pressures to focus on short-term objectives.

As mentioned in Section 6.2.6, the GAO had previously recommended the DCMO position to be held by a career civil servant with a term of 5 to 7 years instead of a political appointee in order to better insulate this transformative leadership role from tidal political influences. While it is likely true that a career civil servant would stand a greater likelihood of remaining in the job longer to allow for a longer term horizon, it is difficult to see how such a position would retain the authority to direct implementation across an enterprise with so many political appointees that by their very positions hold seniority over such a DCMO position. Further, it is not likely that Congress would restructure Section 132 of Title 10 of the U.S. Code to redesignate the DCMO position as career civil service, thereby removing the Senate's authority to advise and consent on appointments to that role.

An alternate approach would be to designate a fixed term of 6 years for the DCMO. Although there are no other Presidentially Pointed, Senate confirmed (PAS) positions with terms longer than 4 years in the Department of Defense, there are other executive branch position with longer tenures. Certain regulatory positions are designated with statutory terms of fixed length[19], meaning that they continue to serve until the completion of their term or when removed for extraordinary circumstances. Given the importance of a long view for change management within the largest single enterprise in the Federal Government, some consideration should be given to stabilizing the DCMO position.

[19] Examples of longer statutory term positions include the Administrator of the Federal Aviation Administration (5 years) under the Department of Transportation, the Commissioner for Internal Revenue (5 years) under the Department of the Treasury, the Commissioner and Deputy Commissioner of the Social Security Administration (6 year terms each), and the Comptroller General (15 years) as head of the GAO.

9.4 THE READER'S JOB

The recommendations provided in this section are meant to challenge the reader in thinking critically about why the defense business enterprise behaves the way it does and how that behavior can be changed. This is not a recipe for enterprise transformation—it does not pretend to offer the play book of steps for navigating the complexities of change management in the Department of Defense. If the reader is a member of the defense business enterprise, then he or she is also challenged to think about what they observe as they are immersed in the business of defense business, whether the observations documented from stakeholder interviews reflect their own experience, and how they can contribute to improving the environment around them.

CHAPTER 10. CONCLUSION

10.1 THE NEED IS COMPELLING

If ever there was a time to drive the defense business enterprise toward more effective investment planning and management, it is now. The United States is on the threshold of significant defense budget reductions that in eras past would have been largely absorbed by personnel reductions. Today, the Department of Defense doesn't have the same flexibilities with respect to force shaping that were used following periods of major conflict. Over the next 10 years, the DoD will have to accommodate 16% less funding per year if statutory sequestration cuts aren't reversed.

Improving the way the DoD invests in the systems supporting its everyday business operations is an essential step in this direction, but it will require taming the "fiefdoms" that reign supreme in what Secretary Gates referred to as the "semi-feudal system" of the Department (Gates 2011). Over the last 15 years, the DoD's investment practices have been characterized by the GAO and others as disconnected, duplicative, undisciplined, and wasteful. The growing frustration with this quagmire has led to a recurring cycle of corrective legislation leading to reactive defense investment policy, followed by painful reform initiatives that miss their target and foster resistance in the enterprise, resulting in documented failures. Within the last 6 years, Congress has stepped in to more actively influence how investments are executed, but there has been much less attention paid to the planning.

Today, the DoD is struggling with how to improve these practices, and they come at a time when the Department is working in parallel to craft a more responsive and effective information technology acquisition framework. Neither goal appears to show signs of significant progress at this time, although the establishment of the Deputy Chief Management Officer position as the focal point for enterprise alignment efforts, strategic goal and performance measurement, and business transformation is an important start.

Interviews with stakeholders participating inside the DoD's business systems governance , those subject to its decisions, and independent outside observers reveal common concerns and frustrations. Using the governance framework established by MIT's Center for Information Systems Research (CISR), these challenges can be viewed through three governance lenses corresponding to decision-making structures, alignment mechanisms, and communication methods. Each lens highlights a different set of phenomena, but common linkages exist with their roots in the networked and culturally stovepiped nature off this public administration enterprise.

Stakeholder sentiments were particularly strong about the decision structures in their responses during the interviews. Politicization of the system review and certification process, insufficient time and attention allowed for adequate scrutiny of the systems under development, the proliferation of ad hoc decision-making schemes that circumvent established governance, and an inability to say no to programs were common themes. In addition, Program Executive Officers and Program Managers felt a great deal of confusion about the overlap and conflict among the acquisition governance and the certification governance, both within the Services and at the OSD level.

Interviews also revealed problems in the alignment mechanisms used across the Department. The most common comment to come out of the interviews was the recognition that the investment planning and management framework, including acquisition processes, were still very much system-focused rather than enterprise architecture and business process focused. This system focus creates a myopic emphasis on optimizing locally at the system level to the overall disadvantage of the end-to-end business processes.

Portfolio management is identified by many of those interviewed as a solution to systems and Service stovepipes, but those portfolios must be anchored to the business processes they support. Performance measurement, often cited as a problem for the Department, requires explicit traceability to a set of guiding strategic goals in order to be meaningful. At present there is no overarching goal to improve the Department's investment practices, but there are a great many metrics tracked throughout the enterprise. Goal alignment is immature at present, with only limited connectivity between the business goals

of the Services and OSD. Unfortunately, a history of leadership turnover hampers efforts to establish long-term goals and goal alignment in defense business systems.

Finally, one of the most important shortcomings in the DoD's alignment mechanisms is the lack of incentives to drive cooperation across the Services and Agencies. Statutory responsibilities assigned to the Services to organize, train, and equip their forces independently coupled with strong separate cultural identities that seek to preserve or expand each institution's authorities create an "us versus them" perspective that underlies the budgeting and policy environments.

Related to this last observation is the fact that the Department of Defense does not effectively capture or share knowledge as part of its communication strategy. The IRB serves as the most visible clearing house for information exchange across the various investment activities in the defense business enterprise, but the knowledge shared and created in that forum is not made available to the PEOs and Program Managers that could leverage the situational awareness to make contact with others across the Department who are working to solve similar or complementary problems. In the few examples of program level, cross-Service collaboration available, this tacit knowledge sharing at the point of practice has resulted in "self-rationalizing" of investment effort to maximize use of common solutions to common problems.

One of the cross-cutting themes in each of the three governance lenses is the effect of cultural identity and the use of different languages in the member institutions. Language disparity was identified by stakeholders as impacting goal-setting, business process definition, common data structures, and performance measurement. The IRBs are making progress in select areas on this front, but this seemingly simple challenge costs the Department a tremendous amount of effort in tailoring what should be standard policies and procedures to each environment and decoding organization-specific data to assess progress toward achieving common goals.

Interestingly, these governance challenges are not unique to the DoD despite its unique structure and exceptional complexity. A case study constructed from interviews with over 20 stakeholders at a large, global pharmaceutical company revealed a high degree of

overlap with issues identified in the defense context. However, one of the fundamental differences that sets the DoD apart is the funding model and decision rights allocation. In contrast to the pharmaceutical, where the governance pyramid can be traced up to a single group of senior executives making policy, budget, and implementation decisions, the DoD's enterprise network members stand as fortresses on the landscape. The Services and their lobbying armies exert pressure on Congress to maintain equilibrium where disruption might be what the enterprise needs to move to a more prosperous landscape. Because of that public administration network structure, certain best practices that might be appropriate for a commercial firm must be adapted for application to the DoD.

In order to make lasting progress in resolving the documented issues and challenges, the Department must focus concerted effort in bringing the enterprise into alignment through common goals for business systems investment improvement. With overarching strategic direction in place and traceable Service-specific goals in support, performance measurement should focus on a few key areas with a greater emphasis on outcomes and less on behaviors. In addition, there needs to be an enterprise-wide feedback mechanism on progress toward meeting goals and identification of roadblocks so that the workforce at all levels knows where their contributions are helping move the ball down the field and where additional weight of effort is required.

Investment planning and management must more fully focus on business processes and the architecture rather than on the individual systems as the level of optimization. Business Process Owners must be identified to manage the end-to-end process definition and data standards for each key process in the core mission areas. Working in tandem with these Process Owners, Portfolio Managers should be empowered to align and, as needed, rationalize systems that don't adequately support valid capability gaps in the business processes. The views of these two special advisors to the IRBs should carry a great deal of weight in decisions on system acquisition approval and certification.

As part of an overall enterprise communication strategy, the DoD should take the initiative with Congress to greatly increase communication of progress and challenges in goal achievement to this important stakeholder. Other elements of the communication strategy

include focusing on vertical and horizontal knowledge integration, supported simultaneously by more transparent decision processes, sponsorship of program level collaboration forums, and inter-Service rotation policies for acquisition professionals at the O-5 and civilian equivalent levels.

The final recommendation offered creates an opportunity for Congress to be part of the solution. As mentioned earlier, leadership turnover and the compressed timelines under which politically appointed senior leaders such as the Deputy Chief Management Officer must operate necessarily drive their focus toward demonstrating near-term successes rather than long-term outcomes. The position of the DCMO, like other key regulatory positions in the executive branch, should be given a statutory term of 6 years in order to offer some degree of insulation from the traditional 4-year cycle that often leaves appointees with little more than 2 years to make the substantive impacts that would justify retaining them for a subsequent administration. This creates the "buffer space" to allow the DCMO to take a longer view toward developing and executing business goals that lead to a healthier defense business enterprise.

10.2 AREAS FOR FURTHER STUDY

In the course of conducting this research, many more questions were exposed than could be adequately addressed in this thesis. This section highlights a few of the more important complementary areas of further study that could be pursued. The principle themes are the influence of cultural identity on decision-making in public administration networks, advanced comparison and application of governance and enterprise maturity models to the DoD, principles of knowledge integration and flow patterns across networked enterprises, and incentive homogeneity throughout an enterprise and the impact of incentive misalignment to enterprise priorities. Each of these is discussed in more detail in the following sections.

10.2.1 The Role of Culture in Public Administration Networks

This thesis has touched on the key challenges faced by the Department of Defense in improving its business systems investment planning and management practices. Included in

that analysis were issues of organizational culture and its influence on governance in a public administration network. Organizational and individual identities are encoded in the language of the institutions but there is little empirical evidence for the impact this has on investment effectiveness. This intersection of language and enterprise integration offers an opportunity to hold a mirror up to the defense business enterprise to demonstrate the importance of clearing the communication channels and the parasitic effects of preserving the cultural status quo. A worthwhile companion study would look at other public administration network exemplars such as the Department of Homeland Security in the United States or the various Ministries of Defence abroad to compare investment practices, cultural obstacles to progress, and solutions to overcome those obstacles.

Likewise, it is possible that private sector firms pursuing diversification strategies that support large numbers of independent business units behave more like public administration networks than private firms when the governance structure holding them together is immature or insufficiently empowered. Reviews of cases such as these would open the door to an interesting middle ground of research between private firms and public administration networks.

10.2.2 Governance and Enterprise Maturity Models

Chapter 2 provided a brief look at MIT CISR's five principle governance archetypes in assigning decision rights for the five key IT decisions. Developed over the course of many years with hundreds of companies worldwide, these archetypes are useful for analyzing patterns of IT decision rights allocation within the enterprise, and it would be useful to apply the framework to defense business systems decision-making for a comparison with industry.

On a similar theme, maturity models seem to be quite common these days as a yardstick for assessing how one's enterprise compares with the best practices of industry. As part of the exploration of governance models, as comparative study of MIT CISR's Stages of Enterprise Architecture Maturity (Ross et al. 2006) with the GAO's Information Technology Investment Maturity model (GAO 2004a) and their Enterprise Architecture Management Maturity Framework (GAO 2010b) as applied to the defense business enterprise would

further extend the conversation on the degree to which industry practices are applicable in this context.

10.2.3 Knowledge Integration

Knowledge management is an essential discipline for the learning organization to master and some organizations seem to do it better than others. What is the effect of the network structure on the ability of a public administration network to effectively integrate knowledge where it needs to? Can knowledge flows be charted to help the enterprise identify and remove bottlenecks? Do the transactional costs of sharing knowledge among programs exceed the benefit when there is no formal impetus to do so? If so, can those costs be reduced? These questions get to the heart of building a more agile and responsive enterprise, one that focuses as much attention on reducing duplication of investment in knowledge creation as it does investment in systems.

On the operational military side of the defense environment, much has been written on the subject of capturing and integrating knowledge to improve mission performance. Investigation of the tools and techniques used to effectively collaborate across Services

10.2.4 Incentives

Finally, there is room for extending the analysis to look at the role of individual and organizational incentives in enabling or constraining the results that can be achieved in improving the way the Department of Defense governs its IT investments. Hicks (2008) cited misalignment of incentives as an important obstacle to achieving lasting reform. Further research to characterize the differences in incentive factors across various levels of the defense business enterprise and among the Services would help illuminate the effect of misalignments between strategic business objectives and incentives on efforts to improve the DoD's practices. Can it be accurately assumed that these incentives are homogeneous across the enterprise? Incentive "vectors" could be derived that describe the patterns of behavior engendered by the incentive as well as the strength of those incentives. Maps of these vectors could be drawn referenced to espoused desirable outcomes to demonstrate the extent of alignment of incentives to strategic objectives.

Looking at the incentives environment from a legislative perspective, it would also be enlightening to review the many different pieces of legislation currently active in the U.S. Code to examine the explicit and unintended incentives created in statute that contribute to the behaviors observed in the DoD. What is the role of Congressional intent and statutory language in motivating these behaviors that may run counter to desired outcomes? If the incentives encoded in the law can be explicitly documented, tools drawn from Principle Agency and Bureaucratic Politics Theories can be used to model expected effects within the enterprise.

10.3 FINAL THOUGHTS

The Department of Defense is a very complex enterprise with very complicated problems that elude easy solutions. High pressure external political environments, internal expectations, and institutional norms form the crucible within which the temptation is forged to demonstrate rapid progress in addressing the symptoms of those problems. Time and time again, recommendations come in from all directions to simply apply "proven industry best practices", but those initiatives fall short because they often target the observed surface effects. Short-term gains unravel when the fundamental cultural, organizational, and incentive barriers endemic to this public administration network reemerge to weaken or destroy any concrete progress before it has a chance to set. Recognition of the deeper dysfunction is an essential step toward dealing with the sources rather than the symptoms.

Although this research focused on the DoD's business systems investment practices, that facet of the enterprise is but an instantiation of a much more fundamental set of challenges that reach across all of the Department's many initiatives and mission areas. Mistrust and confusion in governance systems, strategic goal misalignment, performance measurement systems that incentivize the wrong behavior, a culture of guarding rather than sharing information—there is nothing IT- or business system-specific about these. There is likely nothing defense-specific about them either, but they are easier to recognize in this Department because the cultural contrasts among the member institutions are so stark.

As stated previously, the recommendations provided in this thesis are not a transformation roadmap. No transformation of any significant value can be generated from

outside an enterprise this complex despite the many "independent studies" that attempt to do so. Yet the research does set the trajectory for meaningful progress by characterizing the foundational changes that must occur, anchored by a more robust and transparent governance framework. Although legislated mandates and oversight attention tends to focus on decision-making structures as the face of a governance framework, those structures won't stand unless they're built on a solid foundation of enterprise alignment mechanisms and an inclusive communication strategy that looks inward to the enterprise as well as out to the external stakeholders.

The DoD is not lacking for enthusiasm, energy, or wherewithal to make headway in its goals of improving business systems investment planning and management. Indeed, the enterprise focus the Department is adopting is on the cusp of bearing some very real fruit in a few areas, such as enterprise-wide human resource data standards, standards compliance litmus tests in the financial mission area, and strong governance practices in real property management that emphasize IT-enhanced business process design as the foundation for standards and system investment decisions. It remains to be seen whether the looming defense budget cuts elevate the sense of urgency and spur faster progress or force hasty, short-term decisions with disastrous consequences. The pessimist would look at the last 15 years and circle the wagons. But hearing the passion with which defense business enterprise stakeholders express a desire to move the Department in the direction of greater accountability and investment effectiveness, one can't help but feel a little optimism rub off.

References

(1947). National Security Act of 1947. 10 U.S.C. Ch. 2. United States, U.S. Senate Select Committee on Intelligence.

(1949). National Security Act of 1947 as amended by Public Law 216, 81st Congress. 10 U.S.C. Ch. 2. United States, Office of the Secretary of Defense.

(1986). Goldwater-Nochols DOD Reorganization Act of 1986. 10 U.S.C. United States, Department of the Navy Research, Development, and Acquisition.

(1995). Paperwork Reduction Act of 1995. 44 U.S.C. Ch. 35. United States, National Archives.

(1996). Information Technology Management Reform Act of 1996. 40 U.S.C. 1401. United States, National Archives.

(2005). National Defense Authorization Act for Fiscal Year 2005. 10 U.S.C. United States.

(2008). National Defense Authorization Act for Fiscal Year 2008. 10 U.S.C. United States.

(2009). JCAs and Capability Portfolio Management presented to HRM Enterprise Architecture Collaboration Forum. Arlington, VA.

(2010). National Defense Authorization Act for Fiscal Year 2010. 10 U.S.C. United States.

(2011a). Discretionary Spending: Statement of Douglas W. Elmendorf Director, Congressional Budget Office. Joint Select Committee on Deficit Reduction. Washington, DC, CBO.

(2011b). National Defense Authorization Act for Fiscal Year 2012, S.1253, 112th Congress.

Allison, G. T. and M. H. Halperin (1972). "Bureaucratic politics: A paradigm and some policy implications." World Politics: A Quarterly Journal of International Relations: 40-79.

Andrews, R., K. M. Conaway, et al. (2010). House Armed Services Committee Panel on Defense Acquisition Reform Findings and Recommedations. HASC. Washington, DC.

AT&T Government Solutions Inc. (2011). Department of Defense Information Technology Portfolio Repository (DITPR) User's Guide. Dept of Defense. Washington, DC, Dept of the Navy,.

Baker, G. P., M. C. Jensen, et al. (1988). "Compensation and Incentives: Practice vs. Theory." Journal of Finance **43**(3): 593-616.

Boyne, G. A., O. James, et al. (2011). "Top Management Turnover and Organizational Performance: A Test of a Contingency Model." Public Administration Review **71**(4): 572-581.

Brown, A. E. and G. G. Grant (2005). "Framing The Frameworks: A Review of IT Governance Research." Communications of AIS **15**: 696-712.

BTA (2009). DoD IT Defense Business Systems Investment Review Process Guidance. Dept. of Defense. Washington, DC, Business Transformation Agency.

Carter, A. B. (2010). Interim Acquisition Guidance for Defense Business Systems (DBS). Dept. of Defense. Washington D.C., OUSD(AT&L).

Carter, A. B. (2011). Directive-Type Memorandum (DTM) 11-009, Acquisition Policy for Defense Business Systems (DBS). Dept. of Defense. Washington D.C., OUSD(AT&L).

Cavalluzzo, K. S. and C. D. Ittner (2004). "Implementing performance measurement innovations: evidence from government." Accounting, Organizations and Society **29**(3-4): 243-267.

Clark, P. B. and J. Q. Wilson (1961). "Incentive Systems: A Theory of Organizations." Administrative Science Quarterly **6**(2): 129-166.

Commission on Wartime Contracting (2009). Special Report on Contractor Business Systems: Defense agencies must improve their oversight of contractor business systems to reduce waste, fraud, and abuse. CWC Special Report Series. CWC. Arlington, VA.

Cyert, R. M. and J. G. March (1963). A Behavioral Theory of the Firm. Englewood Cliffs, NJ, Prentice-Hall.

Davenport, T. H. and J. E. Short (1990). "The New Industrial Engineering: Information Technology And Business Process Redesign." Sloan Management Review **31**(4): 11-27.

DCMO (2008). Strategic Management Plan. Dept of Defense. Washington, DC.

DCMO (2009). Strategic Management Plan. Dept of Defense. Washington, DC.

DCMO (2011a). 2011 Congressional Report on Defense Business Operations. Dept of Defense. Washington, DC.

DCMO (2011b). FY 11 Strategic Management Plan. Dept of Defense. Washington, DC.

Defense Science Board (2009). Report of the Defense Science Board Task Force on Department of Defense policies and procedures for the acquisition of information technology. Washington, D.C., Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics.

DoD. (2011). "About the Department of Defense (DoD)." Retrieved September 4, 2011, from http://www.defense.gov/about/.

Dyer, J. H. and N. W. Hatch (2004). "Using Supplier Networks to Learn Faster." MIT Sloan Management Review **45**(3): 57-63.

Dyer, J. H. and N. W. Hatch (2006). "Relation-specific capabilities and barriers to knowledge transfers: creating advantage through network relationships." Strategic management journal **27**(8): 701-719.

Eisenhardt, K. M. (1989). "Agency theory: An assessment and review." The Academy of Management Review **14**(1): 57-74.

England, G. (2009). DTM-08-020 IRBs for Defense Business Systems. Dept of Defense. Washington D.C., OSD.

England, G. R. (2006). Capability Portfolio Management Test Case Roles, Responsibilities, Authorities, and Approaches. Dept of Defense. Washington DC, OSD.

England, G. R. (2008). DoDD 7045.20 Capability Portfolio Management. Dept of Defense. Washington DC, OSD.

Englmaier, F., A. Filipi, et al. (2010). "Incentives, reputation and the allocation of authority." Journal of Economic Behavior & Organization.

Fiol, C. M. (2002). "Capitalizing on Paradox: The Role of Language in Transforming Organizational Identities." Organization Science **13**(6): 653-666.

Flynn, M. E. (2011). Military Leadership, Service Networks, and Priorities in Military Spending. 4th Annual Political Networks Conference and Workshops. Ann Arbor, MI, University of Michigan Gerald R. Ford School of Public Policy.

Gansler, J. S. and W. Lucyshyn (2009). Defense Business Transformation. Washington, DC, National Defense University Center for Technology and National Security Policy.

GAO (1994). Executive Guide: Improving Mission Performance Through Strategic Information Management and Technology. Washington, D.C., U.S. Govt. Accounting Office.

GAO (1997a). Business Process Reengineering Assessment Guide. Washington, D.C., U.S. Govt. Accounting Office.

GAO (1997b). Managing for Results: Analytic Challenges in Measuring Performance. Washington, D.C., U.S. General Accounting Office.

GAO (2004a). Information Technology Investment Management: A Framework for Assessing and Improving Process Maturity. Washington, D.C., U.S. Govt. Accountability Office.

GAO (2004b). Information Technology Management: Governmentwide Strategic Planninng, Performance Measurement, and Investment Management Can Be Further Improved. Washington, D.C., U.S. Govt. Accountability Office.

GAO (2007). Best Practices: An Integrated Portfolio Management Approach To Weapon System Investments Could Improve DOD's Acquisition Outcomes. Washington, D.C., U.S. Govt. Accountability Office.

GAO (2010a). DoD Business Transformation: Improved Management Oversight of Business Systems Modernization Efforts Needed. Washington, D.C., U.S. Govt. Accountability Office.

GAO (2010b). Organizational Transformation: A Framework for Assessing and Improving Enterprise Architecture Management (Version 2.0). Washington, D.C., U.S. Govt. Accountability Office.

GAO (2011a). Further Actions Needed to Institutionalize Key Business System Modernization Management Controls. Washington, D.C., U.S. Govt. Accountability Office.

GAO. (2011b, September 4, 2011). "U.S. Government Accountability Office." Retrieved September 4, 2011, from http://www.gao.gov/.

Gates, R. M. (2010). Quadrennial Defense Review Report. Dept. of Defense. Washington, DC, OSD.

Gates, R. M. (2011). "Remarks by Secretary Gates to the American Enterprise Institute." Retrieved June 8, 2011, from http://www.defense.gov/utility/printitem.aspx?print=http://www.defense.gov/transcripts/transcript.aspx?transcriptid=4827.

Gibbons, R. and M. Waldman (1999). Chapter 36 Careers in organizations: Theory and evidence. Handbook of Labor Economics. C. A. Orley and C. David, Elsevier. **Volume 3, Part 2:** 2373-2437.

Gonzales, D., E. Landree, et al. (2007). Navy/OSD collaborative review of acquisition policy for DoD C3I and weapon programs. Santa Monica, CA, RAND.

Grant, R. M. (1996). "Toward a knowledge-based theory of the firm." Strategic management journal **17**: 109-122.

Grover, V., J. Seung Ryul, et al. (1995). "The Implementation of Business Process Reengineering." Journal of Management Information Systems **12**(1): 109-144.

Gulledge Jr, T. R. and R. A. Sommer (2002). "Business process management: public sector implications." Business process management journal **8**(4): 364-376.

Hammer, M. (1990). "Reengineering work: don't automate, obliterate." Harvard business review **68**(4): 104-112.

Harrison, T. (2011). Defense Funding in the budget control act of 2011. Center for Strategic and Budgetary Assessments. Washington, DC.

Hicks, K. (2008). Invigorating Defense Governance. Beyond Goldwater-Nichols. C. f. S. a. I. Studies. Washington, DC, Center for Strategic and International Studies.

Jeffery, M. and I. Leliveld (2004). "Best Practices in IT Portfolio Management." MIT Sloan Management Review **45**(3): 41-49.

Kaplan, R. S., D. P. Norton, et al. (2005). Balanced Scorecard Report: Insight, Experience & Ideas for Strategy-Focused Organizations. Harvard Business School Publishing. Boston, MA.

Kaplan, S. N. and B. A. Minton (2008). "How has CEO turnover changed?" International Review of Finance.

Krieg, K. J. (2006). DoDI 4165.14 Real Property Inventory and Forecasting. Dept of Defense. Washington DC, OUSD(AT&L).

Krieg, K. J. (2007a). Business Capability Lifecycle (BCL) Refinement and Implementation and Extension of Enterprise Risk Assessment Methodology (ERAM). Dept of Defense. Washington DC, OUSD(AT&L).

Krieg, K. J. (2007b). Program Management Tenure and Accountability. Dept of Defense. Washington DC, OUSD(AT&L).

Lieberman, J. (2011, June 22, 2011). "Lieberman Urges Modest Reduction in Senate Confirmed Nominees." Retrieved November 26, 2011, from http://lieberman.senate.gov/index.cfm/news-events/news/2011/6/lieberman-urges-modest-reduction-in-senate-confirmed-nominees.

Marcum, C. Y. (2001). Department of Defense political appointments: positions and process, DTIC Document.

McChrystal, S. (2011). CJCSI 3170.01G Joint Capabilities Integration and Development System. CJCS. Washington, DC.

McGrath, B. (2010). Implementation of Section 1072 of the Fiscal Year (FY) 2010 National Defense Authorization Act (NDAA) — Business Process Reengineering. (BPR). Department of Defense. Washington, DC, DCMO.

Murman, E. M. (2002). Lean enterprise value: insights from MIT's Lean Aerospace Initiative. New York, NY, Palgrave Macmillan.

Neely, A. (1999). "The performance measurement revolution: why now and what next?" International Journal of Operations & Production Management **19**(2): 205-228.

Nicolaou, A. I. (2004). "Quality of postimplementation review for enterprise resource planning systems." International Journal of Accounting Information Systems **5**(1): 25-49.

O'Neill, P. and A. S. Sohal (1999). "Business Process Reengineering A review of recent literature." Technovation **19**(9): 571-581.

OASD (NII) / DoD CIO, Resource Program and Budget Office, et al. (2010). Select & Native Programming Data Input System FY 2011 President's Budget Request.

OASD (Public Affairs). (2010, August 9). "Sec. Gates Announces Efficiencies Initiatives." Retrieved September 4, 2011, from http://www.defense.gov/releases/release.aspx?releaseid=13782.

OMB (1996). Circular A-130 "Management of Federal Information Resources", Transmittal No. 3. OMB. Washington, DC, Federal Register. **61:** 6428-6453.

OMB (2000). Circular A-130 "Management of Federal Information Resources", Transmittal No. 4. OMB. Washington, DC, Federal Register. **65:** 77677-77687.

OPM (2008). Presidential Transition Guide to Federal Human Resources Management. Washington, DC, Office of Personnel and Management.

OSD (2010a). A New Approach for Delivering Information Technology Capabilities in the Department of Defense. Washington, DC: 20.

OSD (2010b). Revised Organizational Structure for the Office of the Secretary of Defense. Washington, DC: 134.

OUSD (AT&L). (2011). "Defense Acquisition Portal." Retrieved September 4, 2011, from https://dap.dau.mil/policy/Lists/Policy%20Documents/Organizations%20USD%20%20AT%20L.aspx?tag=USD%20%20AT%20L&group=Organizations.

OUSD (Comptroller) / CFO (2011). United States Department of Defense Fiscal Year 2012 Budget Request. Washington DC.

OUSD (P&R) Information Management (2011a). Human Resources Management Investment Review Board Management Plan. Dept of Defense. Arlington, VA.

OUSD (P&R) Information Management. (2011b). "Joint Enterprise Baseline Release 2.0." Retrieved October 20, 2011, from http://www.prim.osd.mil/init/jeb.html.

Reijers, H. and S. Liman Mansar (2005). "Best practices in business process redesign: an overview and qualitative evaluation of successful redesign heuristics." Omega **33**(4): 283-306.

Rhodes, D. H., A. M. Ross, et al. (2009). Architecting the system of systems enterprise: Enabling constructs and methods from the field of engineering systems, IEEE.

Rhodes, R. A. W. (1996). "The New Governance: Governing without Government1." Political studies **44**(4): 652-667.

Ross, J., P. Weill, et al. (2006). Enterprise Architecture As Strategy: Creating a Foundation for Business Execution, {Harvard Business School Press}.

Rumsfeld, D. H. (2003). "Transformation Planning Guidance." Washington, DC: Department of Defense: 6-7.

Simon, H. A. (1956). "Rational choice and the structure of the environment." Psychological review **63**(2): 129.

SIPRI Institute (2010). SIPRI Yearbook 2010. Stockholm International Peace Research Institute. Stockholm, Sweden.

Stoker, G. (1998). "Governance as theory: five propositions." International social science journal **50**(155): 17-28.

Tirole, J. (1994). "The Internal Organization of Government." Oxford Economic Papers **46**(1): 1-29.

U.S. Government Printing Office. (2011). "Federal Digital System." Retrieved December 18, 2011, from http://www.gpo.gov/fdsys/search/home.action.

von Hippel, E. (2002). Horizontal innovation networks—by and for users. Cambridge, MA, MIT Sloan School of Management. **Working Paper 4366-02**.

Walker, D. M. (2004). Further Actions Are Needed to Effectively Address Business Management Problems and Overcome Key Business Transformation Challenges: Testimony before the Subcommittee on Readiness and Management Support, Committee on Armed Services, U.S. Senate. GAO-05-140T. Washington, D.C., U.S. Government Accountability Office.

Walker, D. M. (2006). Implementing Chief Operating Officer/Chief Management Officer Positions in Federal Agencies: Testimony before the Subcommittee on Oversight of Government Management, the Federal Workforce, and the District of Columbia, Committee on Homeland Security and Governmental Affairs, U.S. Senate. GAO-06-322T. Washington, D.C., U.S. Government Accountability Office.

Weill, P. (2004). "Don't just lead, govern: How top-performing firms govern IT." MIS Quarterly Executive **3**(1): 1-17.

Weill, P. and M. Broadbent (1998). Leveraging the new infrastructure: how market leaders capitalize on information technology, Harvard Business Press.

Weill, P. and J. Ross (2005). "A matrixed approach to designing IT governance." MIT Sloan Management Review **46**(2): 26-34.

Weill, P. and J. Ross (2009). IT Savvy: What Top Executives Must Know to Go from Pain to Gain, Harvard Business Press.

Weill, P. and J. W. Ross (2004). IT Governance : How Top Performers Manage IT Decision Rights for Superior Results. Boston, Harvard Business School Press.

Wolfowitz, P. D. (2004). Information Technology Portfolio Management. Dept of Defense. Washington DC, OSD.

Wolfowitz, P. D. (2005). DTM-05-006 DoD Business Transformation. Dept of Defense. Washington DC, OSD.

Womack, J. P. and D. T. Jones (2003). Lean thinking: banish waste and create wealth in your corporation, Simon and Schuster.

Wood, B. D. and M. P. Marchbanks III (2008). "What Determines How Long Political Appointees Serve?" Journal of Public Administration Research and Theory **18**(3): 375-396.

Wright, B. E. and S. K. Pandey (2010). "Transformational Leadership in the Public Sector: Does Structure Matter?" Journal of Public Administration Research & Theory **20**(1): 75-89.

APPENDIX A. INTERVIEW QUESTIONS FROM DOD STAKEHOLDER INTERVIEWS

DoD Internal Interviews

Purpose

The purpose of this interview is to gain a clearer understanding of the current state of information technology (IT) investment planning and IT governance within the Department of Defense (DOD) Information Enterprise (IE) with an emphasis on its business and infrastructure systems. The focus of the questions is to capture the perspectives of enterprise stakeholders regarding the alignment of DOD IE priorities with strategic defense objectives and to help characterize the challenges and successes in the existing defense IT governance framework. Of particular interest are cases in which practice differs from documented processes and the driving reasons for those departures. A key aspect of this assessment is gaining an appreciation for stakeholder views of the value they would expect the DOD to derive from its IT investments and the degree to which the actual investments are meeting those expectations. Many of the challenges faced by the DOD in this context are similar to those in commercial industry where the ability to drive value from IT investments and capabilities can be a critical differentiator in a competitive environment. To that end, the questions below are similar to those that have been used with IT professionals in the private sector.

Interview Questions

1. General
    a. In which organization do you work and what are your responsibilities within that organization?
    b. What is the strategic focus of your organization? What are the strategic objectives or key goals?
    c. How are your organization's priorities linked to strategic defense priorities?
    d. Are there conflicting priorities and how are those conflicts resolved?
2. Responsibilities and Authorities
    a. With the responsibilities you're given, do you have the decision-making authorities you feel you need?
    b. If not, what authorities do you lack and what are the primary obstacles?
    c. Is accountability aligned with responsibility and authority?
3. Issues and Challenges

a. What do you see as the most pressing issues and challenges impacting DOD IT investment planning and governance?
b. What initiatives have been used to overcome these challenges?
c. Are there any success stories that come to mind? What factors contributed to or determined success?

4. Decisions about enterprise processes
    a. Who decides to what extent and where processes will be standardized, shared and common?
    b. Who decides to what extent and where data will be standardized, shared and common?
5. Stakeholder Expectations
    a. What are your top 5 expectations for the value the DOD should derive from its business and infrastructure system investments?
        i. How important is each on a scale of 1 – 5, with 1 being least important and 5 being most important?
        ii. How would you assess that the DOD is delivering on each of those expectations on a scale of 1 to 5, with 1 being low performance and 5 being very strong performance?
6. Key processes relating to Governance and Investment Planning
    a. Who are the key participants from your organization in each of these systems: Defense Acquisition System (DAS), Planning, Programming, Budgeting, and Execution (PPBE); Joint Capabilities Integration Development System (JCIDS); Business Capability Lifecycle (BCL)
    b. How do these participants share information and decisions?
    c. Who (organizations or individuals) should be involved in these processes that aren't?

7. Key metrics:
    a. What metrics does your organization use to assess its performance against the strategic objectives, key goals, or high level performance targets?
    b. Are there any metrics that your organization uses to evaluate the effectiveness of any aspect of the IT investment planning process?
8. Interactions with others
    a. What challenges have you encountered in interacting with other organizations that you depend on to do your job?
    b. Of the people you interact with inside and external to your organization, who most impacts your decisions (positively or negatively)?
9. Other
    a. Are there any other questions you were expecting me to ask or are there any other aspects of the defense information systems investment process you would like to discuss?

Thank you for your time and attention—I will follow up with you to validate my interpretation of your responses or if I have any questions to clarify what I've captured.

External Interviews

Purpose

The purpose of this interview is to gain a clearer understanding of the current state of information technology (IT) investment planning and IT governance within the Department of Defense (DoD) Information Enterprise (IE) with an emphasis on its business and infrastructure systems. The focus of the questions is to capture the perspectives of enterprise stakeholders regarding the alignment of DoD IE priorities with strategic defense objectives and to help characterize the challenges and successes in the existing defense IT governance framework. Of particular interest are cases in which practice differs from documented processes and the driving reasons for those departures. A key aspect of this assessment is gaining an appreciation for stakeholder views of the value they would expect the DoD to derive from its IT investments and the degree to which the actual investments are meeting those expectations. Many of the challenges faced by the DoD in this context are similar to those in commercial industry where the ability to drive value from IT investments and capabilities can be a critical differentiator in a competitive environment. To that end, the questions below are similar to those that have been used with IT professionals in the private sector.

Interview Questions

1. General
    a. In which organization do you work and what are your responsibilities within that organization?
    b. What is the strategic focus of your organization?
    c. What aspects of the DoD business system or IT investment management framework do you participate in, oversee, or review?
2. Issues and Challenges
    a. What do you see as the most pressing issues and challenges impacting DoD IT investment planning and governance? To what extent do they impact your ability to do your job?
    b. What initiatives have been used to overcome these challenges?
    c. Are there any success stories that come to mind? What factors do you believe contributed to or determined success?
    d. Are there models for success that might be applicable from other communities (other defense, other Federal, academia, industry) in addressing these challenges?
3. Decisions about enterprise processes
    a. From your perspective, who decides to what extent and where processes will be standardized, shared and common?
    b. Who decides to what extent and where data will be standardized, shared and common?
4. Stakeholder Expectations
    a. What are your top 5 expectations for the value the DoD should derive from its business and infrastructure system investments?
        i. How important is each on a scale of 1 – 5, with 1 being least important and 5 being most important?
        ii. How would you assess that the DoD is delivering on each of those expectations on a scale of 1 to 5, with 1 being low performance and 5 being very strong performance?
5. Key processes relating to Governance and Investment Planning
    a. Are there governance bodies that you participate in or interact with that you observe to be particularly effective? What factors do you believe contribute to that success?
    b. Conversely, are there governance bodies that are particularly ineffective and what factors contribute?
    c. Based on your interaction with these governance bodies, how would you characterize the degree of information sharing across the governance processes?

   d. How would you characterize the effectiveness of communicating investment management policies and decisions across the DoD Information Enterprise?
   e. Are there stakeholders that are underrepresented in these processes?
6. Performance Measurement:
   a. What metrics have you observed to be particularly effective in assessing the DoD's progress in achieving its strategic objectives, key goals, or high level performance targets for the Information Enterprise?
   b. Are there any metrics from other communities (other defense, other Federal, academia, industry) that you feel would be useful in evaluating the effectiveness of any aspect of the IT investment planning process?
7. Other
   a. Are there any other questions you were expecting me to ask or are there any other aspects of the defense information systems investment process you would like to discuss?

Thank you for your time and attention—I will follow up with you to validate my interpretation of your responses or if I have any questions to clarify what I've captured.

APPENDIX B. RECRUITMENT MESSAGE AND INFORMED CONSENT

Recruitment Message

Interview subjects will be specifically selected based on their positions in the organizations involved in the Department of Defense processes for information technology investment planning. Contacts with these interviewees will occur via phone and email. The following script will be read to them for phone contacts:

Phone Script – *"Sir (or Ma'am), Good morning (afternoon). My name is Lieutenant Colonel Dustin Ziegler, an Air Force Lean Advancement Initiative Fellow at the Massachusetts Institute of Technology. I'm conducting research on the Department of Defense Information Technology investment planning framework and I'm interested in interviewing you as a stakeholder and a key participating member of one of the DOD processes involved. The purpose of this interview is to gain a clearer understanding of the current state of information technology (IT) investment planning and IT governance within the Department of Defense (DOD) Information Enterprise (IE) with an emphasis on its business and infrastructure systems. The focus of the questions is to capture the perspectives of enterprise stakeholders regarding the alignment of DOD IE priorities with strategic defense objectives and to help characterize the challenges and successes in the existing defense IT governance framework. Of particular interest are cases in which practice differs from documented processes and the driving reasons for those departures. A key aspect of this assessment is gaining an appreciation for stakeholder views of the value they would expect the DOD to derive from its IT investments and the degree to which the actual investments are meeting those expectations.*

My intent is to record the interview digitally with your prior approval so that I may refer back to it during my data analysis. Unless you give me permission, I will not quote you by name nor will I associate any personally identifiable information with the answers you give me in my published products. Prior to the interview you will have an opportunity to review and sign an informed consent form.

With your approval I would like to schedule one hour on your calendar to conduct the interview. Can you provide a point of contact to arrange for this appointment?"

If the contact refers me to someone else to interview in their stead, I will read the same script with the addition *"Mr./Ms. (referring contact's name) gave me your name and contact information"* after I introduce myself in the script.

For email contacts, the following message text will be used –

Sir (or Ma'am),

My name is Lieutenant Colonel Dustin Ziegler, an Air Force Lean Advancement Initiative Fellow at the Massachusetts Institute of Technology. I'm conducting research on the Department of Defense Information Technology investment planning framework and I'm interested in interviewing you as a stakeholder and a key participating member of one of the DOD processes involved. The purpose of this interview is to gain a clearer understanding of the current state of information technology (IT) investment planning and IT governance within the Department of Defense (DOD) Information Enterprise (IE) with an emphasis on its business and infrastructure systems. The focus of the questions is to capture the perspectives of enterprise stakeholders regarding the alignment of DOD IE priorities with strategic defense objectives and to help characterize the challenges and successes in the existing defense IT governance framework. Of particular interest are cases in which practice differs from documented processes and the driving reasons for those departures. A key aspect of this assessment is gaining an appreciation for stakeholder views of the value they would expect the DOD to derive from its IT investments and the degree to which the actual investments are meeting those expectations.

My intent is to record the interview digitally with your prior approval so that I may refer back to it during my data analysis. Unless you give me permission, I will not quote you by name nor will I associate any personally identifiable information with the answers you give me in my published products. Prior to the interview you will have an opportunity to review and sign an informed consent form.

With your approval I would like to schedule one hour on your calendar to conduct the interview. Can you provide a point of contact to arrange for this appointment?

Very Respectfully,

Lt Col Dustin Ziegler
Air Force Lean Advancement Initiative Fellow
Massachusetts Institute of Technology
540-272-7560
zieglerd@mitedu

Informed Consent

CONSENT TO PARTICIPATE IN INTERVIEW

You have been asked to participate in a research study conducted by Lt Col Dustin Ziegler, an Air Force Lean Advancement Initiative Fellow from the Engineering Systems Division at the Massachusetts Institute of Technology (M.I.T.). The purpose of the study is to obtain stakeholder perspectives about the Department of Defense Information Technology (IT) investment planning framework, including key issues and challenges, stakeholder expectations, and best practices. The results of this study will be included in Lt Col Ziegler's Masters thesis. You were selected as a possible participant in this study because of your role as a member of a key participating organization in an essential investment planning process. You should read the information below, and ask questions about anything you do not understand, before deciding whether or not to participate.

• This interview is voluntary. You have the right not to answer any question, and to stop the interview at any time or for any reason. We expect that the interview will take about 60 minutes.

• You will not be compensated for this interview.

• Unless you give us permission to use your name, title, and / or quote you in any publications that may result from this research, the information you tell us will be confidential.

• We would like to record this interview digitally so that we can use it for reference while proceeding with this study. We will not record this interview without your permission. If you do grant permission for this conversation to be recorded digitally, you have the right to revoke recording permission and/or end the interview at any time.

This project will be completed by February 2012. All interview recordings will be stored in a secure work space until one year after that date. The audio file will then be destroyed.

I understand the procedures described above. My questions have been answered to my satisfaction, and I agree to participate in this study. I have been given a copy of this form.

(*Please check all that apply*)

[] I give permission for this interview to be recorded digitally.

[] I give permission for the following information to be included in publications resulting from this study:

[] my name [] my title [] direct quotes from this interview

Name of Subject

Signature of Subject _____ Date _____

Signature of Investigator _____Date _____

Please contact Lt Col Ziegler (540-272-7560 or zieglerd@mit.edu) with any questions or concerns.

If you feel you have been treated unfairly, or you have questions regarding your rights as a research subject, you may contact the Chairman of the Committee on the Use of Humans as Experimental Subjects, M.I.T., Room E25-143b, 77 Massachusetts Ave, Cambridge, MA 02139, phone 1-617-253-6787.

APPENDIX C. INTERVIEW QUESTIONS FROM XYZ PHARMA CASE

The XYZ Pharma case study was focused primarily on helping Shared Services improve the support it provided to the business units in several fundamental areas as described in Chapter 8. As part of this process, the study team interviewed stakeholders both within Shared Services and in the dedicated IT teams aligned under the business units. For this reason the interview questions used were tailored to the two stakeholder groups.

Shared Services Interviews

8. General
    a. What is the strategic focus of Shared Services and your division within Shared Services?
    b. What are the strategic objectives, key goals, or high level performance targets for Shared Services and your division within Shared Services?
    c. Who are the key stakeholders or opinion leaders in Shared Services?
9. The role of IT
    a. What are the Shared Services priorities from an IT perspective?
    b. What are the current issues and challenges impacting Shared Services from an IT perspective?
    c. What initiatives have been used to overcome Shared Services challenges from an IT perspective?
    d. Are there any IT success stories that come to mind? What factors contributed to or determined success?
10. Regarding your relationship with Shared Services
    a. As an internal stakeholder, what are your top 5 expectations from Shared Services?

i. How important is each on a scale of 1 – 5, with 1 being least important and 5 being most important?

ii. How would you assess Shared Services is delivering on each of those expectations on a scale of 1 to 5, with 1 being low performance and 5 being very strong performance?

b. What challenges have you encountered in interacting with other units within Shared Services?

11. Key processes relating to Governance, Technology Planning, and Business Case Development

a. Describe the key processes Shared Services uses to make IT investment decisions

b. Describe the key processes Shared Services uses to build budget requirements

c. Describe the key processes Shared Services uses to build, review, and advance project business cases

d. How would you characterize your success at getting Enterprise level IT investment projects approved?

12. Key metrics:

a. What metrics do you use to assess performance against the strategic objectives, key goals, or high level performance targets?

b. Are there any metrics that are used to evaluate performance or effectiveness of IT?

c. Do you use other metrics to assess your budgeting, IT decision-making, and project proposal processes?

13. Documentation

a. Are there any documents you can provide to shed more light on Shared Services IT capability, technology lifecycle planning, IT decision-making, or business case development?

b. Would you be able to provide one or more examples of past Enterprise level IT project proposals that were approved?

Business Unit IT Division

1. General
    a. What is the strategic focus of your BU IT Division?
    b. What are your BU IT Division's strategic objectives, key goals, or high level performance targets?
    c. Who are the key stakeholder or opinion leaders in your BU IT Division?
2. The role of IT
    a. What are your BU IT Division's priorities from an IT perspective?
    b. What are the current issues and challenges impacting your BU IT Division from an IT perspective?
    c. What initiatives have been used to overcome your BU IT Division's challenges from an IT perspective?
    d. Are there any IT success stories that come to mind? What factors contributed to or determined success?
3. Regarding your relationship with Shared Services
    a. What are your BU IT Division's top 5 expectations from Shared Services?
        i. How important is each on a scale of 1 – 5, with 1 being least important and 5 being most important?
        ii. How would you assess Shared Services is delivering on each of those expectations on a scale of 1 to 5, with 1 being low performance and 5 being very strong performance?
    b. What challenges have you encountered in interacting with Shared Services and/or within Shared Services?
4. Key processes relating to Governance, Technology Planning, and Business Case Development
    a. Describe the key processes your BU IT Division uses to make IT investment decisions
    b. Describe the key processes your BU IT Division uses to build budget requirements
    c. Describe the key processes your BU IT Division uses to build, review, and advance project business cases

d. How would you characterize your success at getting both Business Unit and Enterprise level IT investment projects approved?

5. Key metrics: Consider each of the following questions from both a pure Business Unit perspective and from your point of view as an IT colleague representing the Business Unit
    a. What metrics do you use to assess performance against the strategic objectives, key goals, or high level performance targets?
    b. Are there any metrics that are used to evaluate performance or effectiveness of IT?
    c. Do you use other metrics to assess your budgeting, IT decision-making, and project proposal processes?
6. Documentation
    a. Are there any documents you can provide to shed more light on your BU IT Division's IT capability, technology lifecycle planning, IT decision-making, or business case development?
    b. Would you be able to provide one or more examples of past Business Unit and/or Enterprise level IT project proposals that were approved?